

**EPA Superfund
Record of Decision:**

**EASTERN SURPLUS
EPA ID: MED981073711
OU 01
MEDDYBEMPS, ME
09/28/2000**

U.S. ENVIRONMENTAL PROTECTION AGENCY
EPA NEW ENGLAND

RECORD OF DECISION SUMMARY

FOR

EASTERN SURPLUS COMPANY SUPERFUND SITE

MEDDYBEMPS, MAINE

September 2000

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DECLARATION FOR THE RECORD OF DECISION

A. SITE NAME AND LOCATION

Eastern Surplus Company Superfund Site
Meddybemps, Washington County, Maine
MED981073711
EPA Lead
Entire Site, No Separate Operable Units

B. STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Eastern Surplus Company Superfund (Site), in Meddybemps, Maine, which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 USC § 9601 et seq., and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300 et seq., as amended. The Director of the Office of Site Remediation and Restoration (OSRR) has been delegated the authority to approve this Record of Decision.

This decision was based on the Administrative Record, which has been developed in accordance with Section 113(k) of CERCLA, and which is available for review at the Calais Public Library and at the United States Environmental Protection Agency (EPA, EPA New England, OSRR Records Center in Boston, Massachusetts). The Administrative Record Index (Appendix C to the ROD) identifies each of the items comprising the Administrative Record upon which the selection of the remedial action is based.

The State of Maine concurs with the Selected Remedy.

C. ASSESSMENT OF THE SITE

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

D. DESCRIPTION OF THE SELECTED REMEDY

This ROD sets forth the selected remedy for the entire Site at the Eastern Surplus Company Superfund Site, which involves the restoration of the contaminated groundwater using extraction and treatment. The remedy also allows for the use of enhancements to the groundwater extraction and treatment system, including the flushing of clean water and/or the injection of an in-situ treatment reagent

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to facilitate the removal and/or destruction of the contamination in the groundwater. Institutional controls will also be used to restrict the future use of the Site to prevent ingestion of groundwater and disturbance of archaeological resources. This cleanup approach will prevent the off-site migration of contaminated groundwater and restore the aquifer to drinking water standards. The selected remedy is a comprehensive approach that addresses all current and potential future risks at the Site. As a result of the previous removal actions, the contaminated groundwater was the only medium requiring remedial action. Specifically, this remedial action includes the extraction of two separate plumes of contaminated groundwater and the treatment of the extracted water prior to re-infiltration. The remedial measures will prevent the migration of contaminated groundwater and restore the groundwater to drinking water standards.

The major components of this remedy are:

1. Extraction and treatment of the contaminated groundwater in two distinct plumes (northern plume and southern plume) will be performed. Groundwater from each of the two contaminated plumes will be extracted and treated by a common treatment system. Each extraction system will be designed to prevent off-site migration of contaminated groundwater and restore the aquifer to drinking water standards;
2. The groundwater extraction system will be enhanced by flushing of treated water and/or injection of a chemical reagent to facilitate the removal of contamination;
3. Land-use restrictions in the form of deed restrictions, such as easements and covenants to prevent ingestion of groundwater and disturbance of archaeological resources, will be used to control the two Site parcels agreed to be owned by the State of Maine. The State has agreed to impose institutional controls that run with the land for these parcels. Institutional controls shall also be implemented on those other Site properties upon which groundwater contamination is located until groundwater meets cleanup levels;
4. Long-term monitoring of groundwater, surface water, and sediments will be performed to evaluate the success of the remedial action. Additional biota sampling (fish, mammals, and plants) may also be performed, as necessary;
5. Portions of the mitigation of adverse effects upon the archaeological resources at the Site, caused by the non-time-critical removal action's soil excavation in 1999, will be performed as part of the remedial action; and
6. Five-year reviews will be performed to assess protectiveness until cleanup goals have been met.

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This action represents the first and only anticipated operable unit for the Site. Both time- critical and non-time-critical removal actions were implemented at the Site to address contaminated soils, drums, cylinders, and other containers.

Previous removal actions at the Site addressed principal and low-level threat wastes. The selected response action addresses the remaining contamination found in groundwater by containing and treating the contamination to achieve groundwater restoration.

E. STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduce the toxicity, mobility, or volume of materials comprising principal threats through treatment).

Because this remedy will result in hazardous substances remaining in the groundwater on-site above levels that allow for unlimited use and unrestricted exposure (and groundwater and/or land use restrictions are necessary), a review will be conducted within five years after initiation of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

F. SPECIAL FINDINGS

None.

G. ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for this Site.

1. Chemicals of concern (COCs) and their respective concentrations.
2. Baseline risk represented by the COCs.
3. Cleanup levels established for COCs and the basis for the levels.

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4. How source materials constituting principal threats are addressed.
5. Current and reasonably anticipated future land assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD.
6. Potential land and groundwater use that will be available at the Site as a result of the selected remedy.
7. Estimated capital, operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected.
8. Key factor(s) that led to selecting the remedy (i.e. describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria; highlighting criteria key to the decision).

H. AUTHORIZING SIGNATURES

This ROD documents the selected remedy for the groundwater at the Eastern Surplus Company Superfund Site. The State of Maine Department of Environmental Protection concurs with the remedy.

Concur and recommended for immediate implementation:

U.S. Environmental Protection Agency

By: _____ Date: _____
Patricia L. Meaney, Director
Office of Site Remediation and Restoration
EPA New England

RECORD OF DECISION SUMMARY

A. SITE NAME, LOCATION AND BRIEF DESCRIPTION

**Eastern Surplus Company Superfund Site
Meddybemps, Washington County, Maine
MED981073711**

EPA Lead

Entire Site, No Separate Operable Units (2 previous removal actions)

The Eastern Surplus Company Site (Site) consists of a 4-5 acre parcel of land which is located in Meddybemps, Maine. The Site at the surface is adjacent to Meddybemps Lake to the north, the Dennys River to the east, and Route 191 to the south. The western boundary of the “surficial” Site is roughly defined by a fence adjacent to a private road. Prior to the two earlier removal actions, the Site was mostly covered by junk/surplus materials with any open spaces covered with vegetation. Some of the junk/surplus materials contained hazardous substances, which were released into the Site soils and further released into the groundwater. Two distinct plumes of contaminated groundwater have been identified. These are referred to as the “northern plume” and the “southern plume.” The northern plume is within the surficial boundaries of the Site, while the southern plume extends beyond the surficial Site boundaries across Route 191. See Figure 1 for Site location.

The topography of the Site causes surface water to flow predominantly towards the Dennys River, although some portions of the Site also have surface water flow towards Meddybemps Lake. The Site is located at the outlet of Meddybemps Lake to the Dennys River. Meddybemps Lake is considered a high quality lake. The Dennys River is a class AA river that is one of the seven rivers in the State of Maine designated for the restoration of the Atlantic Salmon.

A more complete description of the Site can be found in Section 1 of the Remedial Investigation Report prepared by Tetra Tech NUS for EPA New England and released in July 1999.

B. SITE HISTORY AND ENFORCEMENT ACTIVITIES

1. History of Site Activities

The Site was historically used as farm land and was the location of a mill. In 1946, a portion of the Site was acquired by Mr. Harry Smith, Sr. (now deceased). The present owner of this portion of the Site is Harry J. Smith, Jr. The two Smiths owned and operated a business known as the Eastern Surplus Company, which stored and resold, among other things, supplies, materials and equipment acquired from the U.S. Department of Defense (DOD). The Eastern Surplus Company used the Site as a salvage/storage yard to store these items. Mr. Smith, Sr. also installed and used

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a hydroelectric station to generate power until 1966. Most business and storage activities ceased at the Site between 1973 and 1976. By the 1970's, thousands of compressed gas cylinders, drums, small containers, and other materials were present at the Site.

A more detailed description of the Site history can be found in Section 1.2 of the Remedial Investigation Report.

2. History of Federal and State Investigations and Removal and Remedial Actions

In 1985, the Maine Department of Environmental Protection (ME DEP) performed an inspection of the Site and identified the Site as an uncontrolled hazardous substance site in need of response. The ME DEP initiated a removal action to stabilize the Site. The ME DEP removed approximately 120 transformers and fenced the Site. The Maine State Police also swept the Site for munitions.

In 1986, EPA took over the removal action initiated by the ME DEP. The removal involved the inspection, evaluation, sampling (if necessary), and disposal (if necessary) of: 312 fifty-five gallon drums; 24 thirty gallon cans; 1,226 five gallons cans; 168 one hundred pound containers of calcium carbide; 1,182 miscellaneous small containers; 10 cubic yards of asbestos; and 2,674 compressed gas cylinders. EPA removed thousands of leaking drums and cans from the Site. EPA also provided oversight of DOD's removal of several thousand compressed gas cylinders. The EPA time-critical removal action was completed in 1990. The removal was successful at removing the hazardous substances above the ground surface.

The Site was proposed for inclusion on the National Priorities List (NPL) on October 2, 1995 (60 Fed. Reg. 51390). The Site was listed for final inclusion on the NPL on June 17, 1996 (61 Fed. Reg. 30510). In accordance with statutory requirements for NPL sites, the Agency for Toxic Substances and Disease Registry (ATSDR) completed a Preliminary Health Assessment for the Site. The ATSDR report recommended that further studies be performed to identify potential public health threats.

EPA began a remedial investigation and feasibility study (RI/FS) in 1996. After the RI/FS was completed in 1999, EPA issued a Proposed Plan for the final remedial action at the Site in August 1999.

Based upon the preliminary results of the RI/FS and previous investigations, and following the completion of an Engineering Evaluation/Cost Analysis (EE/CA), EPA signed an Action Memorandum in July 1998 to initiate a non-time-critical removal action (NTCRA) at the Site. The objective of the NTCRA was to eliminate the source of soil, groundwater and sediment contamination by removing soils with levels of contamination above the cleanup levels and initiating

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a source control groundwater extraction and treatment system to remove some of the contaminated mass in the aquifer and to prevent the off-site migration of the contamination. The soil portion of the NTCRA was completed in 1999. The groundwater extraction and treatment system for the northern and southern plumes was completed in September 2000.

3. History of CERCLA Enforcement Activities

EPA issued a Unilateral Order to Matheson Gas Products in 1989 to remove eight commercial compressed gas cylinders. Matheson Gas Products complied with the order in 1989.

EPA notified the U.S. Department of Defense (DOD) of liability with respect to the Site and demanded reimbursement of the response costs in 1993. In 1995, EPA reached a settlement with DOD, as well as the U.S. General Services Administration, for the reimbursement of \$1.4 million in past response costs.

In 1994, on behalf of EPA, the U.S. Department of Justice filed a complaint against the owner of a portion of the Site, Mr. Harry Smith, Jr., for refusing to comply with a CERCLA § 104(e) request for information. On February 25, 1995, the U.S. District Court for the District of Maine entered a \$357,000 default judgment against Mr. Smith, Jr. The collection was referred to the Federal Litigation Unit of the Office of the United States Attorney for the District of Maine. To date, the amount has not been paid; as a result, the U.S. Attorney's office closed out the judgment as uncollectible.

On April 22, 1998, EPA notified owners of the two parcels of property that represent the surficial extent of the Site and DOD of their potential liability with respect to the Site and/or requested their participation in negotiating an agreement to perform or finance CERCLA response activities, including the RI/FS, NTCRA and remedial action. Negotiations with these potentially responsible parties (PRPs) were in fact commenced. These negotiations resulted in the development of a comprehensive cash-out settlement that has resolved the past and future liability of the PRPs. The cash-out settlement was embodied in a Consent Decree. The Consent Decree was approved by the U.S. District Court for the District of Maine in March 1999. The Consent Decree provides EPA with funding for future Site work and requires the landowner PRPs to transfer title of their properties within the "surficial" Site to the State of Maine.

The landowner PRPs have attended many of the public meetings at the Site. The landowner PRPs did not submit any comments as part of the comment period. DOD participated in the early removal actions and has remained informed of the cleanup activities. DOD also did not submit any comments as part of the comment period.

C. COMMUNITY PARTICIPATION

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Throughout the EPA cleanup of the Site, community concern and involvement have been high. Since the Site's listing on the NPL, EPA has kept the community and other interested parties informed of Site activities through informational meetings, fact sheets, press releases and public meetings. Below is a brief chronology of public outreach efforts.

- In June 1997, EPA released a community relations plan that outlined a program to address community concerns and keep citizens informed about and involved in remedial activities.
- On September 30, 1996, EPA held an informational meeting in Meddybemps to describe the plans for the Remedial Investigation and Feasibility Study. EPA has regularly attended the annual Meddybemps Lake Association meeting to update local residents with respect to Site activities.
- On June 9, 1997, May 21, 1998, September 22, 1998, October 28, 1998, May 26, 1999, and July 15, 1999, EPA held informational meetings in Meddybemps to discuss the results of the Remedial Investigation. EPA released 15 public information update fact sheets between 1996 and August 1999.
- On August 18, 1999, EPA made the administrative record available for public review at EPA's offices in Boston and at the Calais Public Library in Calais, Maine. This will be the primary information repository for local residents and will be kept up to date by EPA .
- EPA published a notice and brief analysis of the Proposed Plan in Bangor Daily News, Calais Advertiser, and Quoddy Times and made the plan available to the public at the Calais Public Library.
- From August 20 to September 20 1999, EPA held a 30 day public comment period to accept public comment on the alternatives presented in the Feasibility Study and the Proposed Plan and on any other documents previously released to the public. An extension to the public comment period was requested and as a result, it was extended to December 20, 1999.
- On August 19, 1999, EPA held an informational meeting to discuss the results of the Remedial Investigation and the cleanup alternatives presented in the Feasibility Study and to present the EPA's Proposed Plan to a broader community audience than those that had already been involved at the Site. At this meeting, representatives from EPA answered questions from the public.
- EPA has met with local residents, local officials, and the Meddybemps Lake Association to identify reasonably expected future land uses. A local survey identified the preferred future use of the Site as park or lot for a new church. While the consent decree will result in the transfer of

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the two parcels of property that represent the surficial extent of the Site, there are no restrictions on the future use of the property presently in place.

- On September 8, 1999, EPA held a public hearing to discuss the Proposed Plan and to accept any oral comments. A transcript of this meeting is included in the Administrative Record. The summary of significant comments and EPA's responses are included in the Responsiveness Summary, which is part of this Record of Decision.

D. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

The selected remedy was developed by evaluating a variety of management of migration alternatives to obtain a comprehensive approach for Site remediation. In summary, the remedy provides for the restoration and containment of the contaminated groundwater using extraction and treatment. The remedy also allows for enhancements (flushing and/or chemical reagents) to the extraction and treatment system, if appropriate, to reduce the time period to achieve cleanup standards. Institutional controls will be implemented to control Site use, particularly groundwater ingestion, and environmental monitoring will be implemented to evaluate the success of the cleanup and provide information for the 5 year reviews. The State of Maine has agreed to impose institutional controls on the two parcels that it will own pursuant to the Consent Decree. The groundwater extraction system will address both plumes at the Site with a common treatment system.

The remedy described in this ROD is the third major cleanup action to be performed by EPA at this Site. From 1986-1990, EPA performed a time-critical removal action to remove the hazardous materials stored at the Site. This removal action included the sampling and removal of thousands of compressed gas cylinders, drums, and miscellaneous containers. This first action removed the majority of the hazardous materials stored at the Site. From 1998-present, EPA has been implementing a non-time-critical removal action or NTCRA to address the contamination in the Site soils that were acting as a source to groundwater and sediment contamination. The NTCRA also included a source control groundwater system to prevent the off-site migration of contaminated groundwater. The soil portion of the NTCRA is complete. All contaminated soils have been removed from the Site. The groundwater extraction and treatment system for the northern plume began operation in January 2000. The southern component of the groundwater extraction system began operation in September 2000. See Figures 2 and 3 for the NTCRA Areas of Excavation and Groundwater Extraction Wells.

The remedy described in this ROD will be the third and final cleanup action for the Site. The selected remedy addresses the continuation of the groundwater cleanup initiated by the NTCRA with an expansion of the scope to include restoration of the aquifer and the option for enhancements to reduce the time to success.

With respect to principal threats, the initial removal action and the recent NTCRA have addressed

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the highly contaminated source materials at the Site. With the possible exception of dense non-aqueous phase liquids (DNAPL) that may be present in the bedrock fractures (there has been no positive identification of DNAPL to date), there are no principal threat wastes remaining at the Site. In addition, low-level threat wastes present at the Site were removed as part of the previous removal actions that addressed the principal threat wastes. The selected remedy targets the remaining groundwater contamination, which is the result of the previous infiltration of water through the contaminated soils. EPA has also evaluated the contamination in surface water, sediments, remaining on-site soils, and biota as part of this Record of Decision.

E. SITE CHARACTERISTICS

Chapter 1 of the Feasibility Study contains an overview of the Remedial Investigation. The significant findings of the Remedial Investigation are summarized below.

1. General Characteristics:

The Site at the surface consists of a 4-5 acre parcel of land located in Meddybemps, Maine. Surface water bodies form the eastern and northern boundaries, Route 191 forms the southern boundary, and the chain link fence installed by Maine DEP in 1985 approximates the western boundary. The Site ground surface once had debris/junk covering over 50% of the area, with thick vegetation covering the remaining areas. Some of the junk/surplus materials contained hazardous substances which were released into the Site soils and further released into the groundwater. Two distinct plumes of contaminated groundwater have been identified. These are referred to as the “northern plume” and the “southern plume.” The northern plume is within the surficial boundaries of the Site, while the southern plume extends beyond the surficial Site boundaries across Route 191. A dam controls the outlet of Meddybemps Lake to the Dennys River. A small wetland exists adjacent to the Dennys River just below the dam. Most of the Site is above the flood plain as a steep bank runs along the Dennys River. Some flooding does occur in the northern corner of the Site adjacent to the dam. See Figure 1 for the location and plan view of the Site.

Portions of a former hydropower station that had been operated by the deceased former Site owner sits over the Dennys River at the southern end of the Site. Most of the liquid hazardous waste, drums, containers, and compressed gas cylinders were removed during the first removal action. As was discovered during the course of the RI, the Site still contained (after the first removal action) numerous compressed gas cylinders (some containing gas), munitions, and miscellaneous containers of liquids.

EPA performed a series of investigations to develop an understanding of the nature and extent of contamination at the Site. Each medium will be discussed separately below:

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a. Soil:

The RI began with an initial field program to develop a preliminary understanding of the potential contaminants at the Site and to assist in the development of a more significant investigation plan. In September 1996, EPA's contractor collected 32 soil samples at stained areas, random locations, and locations of previous removal activity. These samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), 22 metals (target analyte list or TAL list), and cyanide.

Using the initial data, EPA developed a sampling strategy for the first major field program. During October 1996, EPA's contractor collected over 500 samples for analysis on-site for select VOCs (headspace), PCBs, and metals using XRF. The majority of the samples were surface samples. However, a geoprobe was used to collect samples to depths of 12 feet. Also, soil gas samples were collected for on-site VOC analysis to assist in the characterization. A 25 foot grid was used for the soil gas results. Screening samples were selected based upon soil gas detects, visual evidence, and, for some, random selection. Based upon the results of the field screening, 60 sample locations were selected for off-site analysis for VOCs, SVOCs, pesticides, PCBs, TAL metals and cyanide. A subset of 20 samples was sent off-site for dioxin analysis. An additional 9 samples were obtained from two suspected source areas at the end of this program. See Figure 4 for the 1996 soil sampling locations.

To refine the understanding of the Site, 10 soil samples were collected and analyzed for PCBs during the installation of a monitoring well in April 1997, 12 additional surface soil samples were collected in June 1997 and analyzed for VOCs and TAL metals, and 16 samples were collected for VOC, SVOC, pesticide, PCB, and TAL analysis in October 1997 in areas where the Site owner had moved some of the non-hazardous debris/junk.

These initial sampling efforts identified several VOCs, PCBs, as well as chromium and lead as the major contaminants at the Site. Tetrachloroethene, trichloroethene, and methylene chloride were the most significant of the detected VOCs, with toluene, xylenes, and ketones also present. SVOCs were present at lower concentrations and less frequently than VOCs. Levels of arsenic and cadmium were sporadically detected above background levels. Very low levels of dioxin were also detected in the soil. An area in the northeastern portion of the Site was identified as having elevated levels of VOCs and an area in the southeastern portion of the Site had elevated levels of PCBs.

Based upon these early results, EPA initiated a field program in October - November 1997 to collect samples for a treatability evaluation to assess thermal desorption technology and also to implement a vapor extraction field test in the northern VOC "hotspot". An additional 67 field

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samples were analyzed for VOCs and 32 samples were sent off-site for VOC, PCB, and TAL metal analysis during this program. See Figure 5 for the 1997 soil sampling locations.

In July 1998, EPA signed an Action Memorandum to approve the implementation of a non-time-critical removal action (NTCRA) at the Site. The NTCRA required the excavation and removal for off-site disposal of soils with PCE, TCE, methylene chloride, PCBs, chromium, lead, and cadmium above the specified cleanup levels. A pre-excavation field program was performed from August 1998 - October 1998. The program included the removal of the remaining on-site junk/debris to allow access to the contaminated soils. Approximately 200 locations resulting in 850 surface and subsurface soil samples were collected and analyzed in an on-site mobile laboratory for VOCs, PCBs, and metals using XRF. Samples were collected to a depth of 25 feet below ground surface. These results provided a delineation of the excavation areas and also provided significant information regarding the distribution of contaminants at the Site. EPA collected additional soil samples during the excavation and removal program to manage the soil excavation and confirm the clean areas. See Figures 6 and 7 for the 1998 and 1999 soil sample areas.

The soil sampling programs at the Site identified several contaminants that represented a significant threat to human health from direct contact and leaching. As of November 1999, all of the soils with contamination above cleanup levels were excavated and removed from the Site. The remaining soils were either free of contamination or contained low levels of contamination. Over the course of the investigations, 38 organic compounds and many metals were detected at low concentrations outside the excavation areas. These contaminants were identified as contaminants of potential concern for consideration in the risk assessment. No significant source areas are believed to remain in the soil at the Site. Figure 8 shows the combination of all of the soil sampling locations. The soil data for the areas outside the excavations is presented in Table 1.

Prior to the NTCRA, on-site soils were the most significantly contaminated medium of the Site. Site-related contaminants were also detected in other media.

b. Surface Water and Sediments:

The Dennys River is a critical habitat for the Atlantic Salmon and is also within an area frequented by Bald Eagles. The Dennys River is a class AA water of the State of Maine. Meddybemps Lake has an area of approximately 6,765 acres with a maximum depth of 38 feet. Meddybemps Lake is classified as a Class GPA water by the State of Maine. Sediments and surface water were first sampled during the October 1996 field program. A total of 10 surface water locations in Meddybemps Lake and the Dennys River were identified and sampled for SVOCs, pesticides, PCBs, and TAL metals, and cyanide. A total of 40 sediment

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locations, 10 of which also included surface water, were identified and sampled for SVOCs, pesticides, TAL metals and cyanide, PCBs (homolog and 13 congeners), grain size and total organic carbon. 23 of the sediment samples were also analyzed for dioxin. Most samples were from depositional areas with some samples collected at depth. See Figure 9 for 1996 surface water and sediment sample locations.

In October 1997, 11 additional surface water samples were collected for VOC, SVOC, pesticides, PCBs, and TAL metal analysis. An additional 15 sediment samples were also collected for VOC, SVOC, pesticide, TAL metal, PCB (homolog and congeners), total organic carbon, and grain size analysis. In June 1998, 6 surface water samples were collected for VOC and TAL metal analysis, and 7 sediment samples were collected for pesticides, PCBs (homologs and congeners), TAL metals, total organic carbon, and grain size. A final set of surface water and sediment samples were collected in June 1999 to address the infrequent detection of several contaminants that were identified in the human health risk assessment of contaminants of potential concern. At that time, 19 surface water samples were collected for VOC, SVOC, and TAL metal analysis, and 12 sediment samples were collected for pesticide, PCB (homolog and congener), and TAL metals analysis. See Figure 10 for 1997, Figure 11 for 1998, and Figure 12 for 1999 surface water and sediment sample locations. Figure 13 shows the combination of all samples to date.

No VOCs were detected in the surface water of Meddybemps Lake or the Dennys River. A small discharge area in a wetland adjacent to the Dennys River did have elevated levels of several VOCs (PCE, TCE, 1,2 DCE, and xylene). This area is directly below the VOC “hot spot” in the northeast corner of the Site. Results of the vapor diffusion sampling indicates that VOCs are discharging to the Dennys River, however, the dilution resulting from the mixing of the groundwater with the Dennys River reduces the VOC concentrations below detection limits. Tables 2 and 3 present a summary of the surface water and sediment results for the Site.

The only SVOC detected in surface water was bis (2-ethylhexyl) phthalate (DEHP). Two samples had concentrations (6 ug/l and 480 ug/l) at or above the MCL of 6 ug/l. The results were not consistent as the DEHP had not appeared in previous samples nor in subsequent samples. A June 1999 event targeted the area with the initial detection of 480 ug/l for extensive surface water sampling. No SVOCs were detected in June 1999. The infrequent detection of DEHP is indication that this compound is unlikely to be a significant Site contaminant.

Several metals have been detected in the surface water. Arsenic, antimony, and thallium were detected during the early sampling events. Thallium was detected in only 1 of 33 samples. The frequency of detection of arsenic and antimony was 2 detections in 33 samples. In addition, much like the SVOCs, arsenic and antimony were not present in the samples collected in June 1999. Low levels of lead, manganese, aluminum, and selenium have also been detected

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in surface water.

Low levels of VOCs (part per billion ug/kg) were detected in the sediments surrounding the Site. With respect to SVOCs, a range of polycyclic aromatic hydrocarbons (PAHs) as well as 4-methylphenol, carbazole, and 2-methylnaphthalene were detected. The highest PAH concentrations were found at locations just below the highway bridge and adjacent to the Town of Meddybemps boat dock. In general, the SVOCs were in the ug/kg range of concentration with only a few areas exceeding 1 mg/kg for total PAHs.

PCBs were extensively detected in the sediments. In Meddybemps Lake, PCB concentrations were below 50 ug/kg. In Mill Pond, PCB concentrations were also quite low except for a small area beginning approximately 60 feet north (upstream) of the former hydrostation. PCB concentrations in this location exceeded 1 mg/kg and were as high as 9 mg/kg. These sediments were removed as part of the NTCRA. Downstream of the hydrostation, the PCBs were above background levels but below 1 mg/kg. The highest concentrations downstream was 500 ug/kg with over 80% of the concentrations below 30 ug/kg.

Pesticides were infrequently detected in the sediments. Low ug/kg concentrations of DDD, DDE, DDT, dieldrin, heptachlor, methoxychlor, and aldrin were detected.

A variety of metals were detected in the sediments. Several of the metals exceeded reference criteria as well as background. However, consistent patterns of elevated metals were not evident.

c. Groundwater:

The groundwater in the Meddybemps area, including the Site, is used as the primary drinking water source. While there are some dug wells that use the overburden groundwater as a drinking water source, most of the drinking water supply wells are in the bedrock. The bedrock at the Site is a combination of the Meddybemps granite with a gabbro-diorite intrusion. The surficial or overburden materials are glacial deposits that range from stratified beds of gravel, sand, and mixed sands/silt. A silty/clay layer appears in the southern portion of the Site.

The overburden at the Site ranges from 0 to 20 feet in thickness. The overburden in the northern portion of the Site is only seasonally saturated with a water table that fluctuates as much as 6 feet during the year. The bedrock is close to the surface in the northern portion of the Site. The overburden in the southern portion of the Site has a saturated thickness of several feet. The depth to bedrock is greater in this area..

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Groundwater monitoring wells have been used to identify the Site geology and as the basis for groundwater chemistry and water levels. The United States Geological Survey (USGS) performed the initial groundwater investigation at the Site. The USGS installed 8 bedrock and 11 overburden monitoring wells in 1996 in addition to the 4 wells that had previously been installed at the Site. An additional 4 overburden wells were installed in April 1997 and an additional bedrock well in May 1998. EPA's contractor, Tetra Tech NUS, installed 2 overburden and 6 bedrock wells during October 1997. An additional, 3 monitoring wells and 6 bedrock extraction wells were installed as part of the NTCRA in 1999. See Figures 14, 15, 16, and 17 for the monitoring wells installed in 1996, 1997, 1998, and 1999 respectively. Figure 18 shows the locations of all monitoring and extraction wells through 1999.

Surface and down-hole geophysics were used to assist in the identification of potential groundwater producing fractures in the bedrock. Several pumping tests have also been performed to obtain an estimate of bedrock hydrology and overburden/bedrock interaction.

The groundwater in the northern portion of the Site exists as one aquifer with movement between the overburden and bedrock. The southern portion of the Site is more complex with evidence of overburden/bedrock communication but the groundwater is also influenced by confining layers.

Six groundwater monitoring events were completed during the RI/FS. Additional sampling was also performed in select wells during pump tests or the SVE pilot test. A complete set of analytical parameters were included in the first several sampling events (VOCs, SVOCs, TAL metals, pesticides/PCB). Samples were also collected for analysis for PCB homologs.

Two distinct areas of groundwater contamination or plumes were identified as part of the RI/FS. Sample results for the northern plume identified tetrachloroethene (PCE) as the major Site contaminant. Trichloroethene (TCE), 1,2 dichloroethene (DCE), 1,1,2 -trichloroethane, xylene, and methylene chloride were also detected in monitoring wells throughout the Site. PCE was detected at a maximum concentration of 6,700 ug/l and methylene chloride was detected at a maximum concentration of 4,300 ug/l in the northern plume. Much of the contamination in the northern plume is believed to be discharging to the Dennys River. A groundwater seep adjacent to the Dennys River contains the same VOCs as the plume. However, high levels of contamination have been detected in the deep bedrock. It is possible that some quantity of DNAPL could have entered the northern bedrock plume. See Figure 18 for the plan view of the northern and southern groundwater contaminant areas.

There is evidence that the plume is also moving to the deep bedrock. However, the bedrock wells across the Dennys River do not support any significant migration under the river. Low levels (single digit ug/l) of PCE are sporadically detected in the bedrock monitoring wells

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across the Dennys River from the northern plume. See Figures 19 and 20 for a cross-section view of the northern and southern plumes

Sample results for the southern plume were generally of lower concentration than the northern plume. However, PCBs were detected in the groundwater beneath and downgradient of the soil PCB “hot spot.” PCBs were detected at a concentration of 3 ug/l in the southern plume and PCE was detected at a maximum concentration of 1,100 ug/l. The southern plume is also believed to be discharging to the Dennys River. The concentration gradient in the southern plume indicates that the highest concentrations are in the overburden and shallow bedrock. See Tables 4 and 5 for a summary of the groundwater results.

No residential wells have been significantly impacted by the Site contaminants. Every residential well sampled, except one, was free of site-related contaminants. A deep bedrock well adjacent to the Site does occasionally contain low levels of PCE. These levels are consistently below MCLs.

d. Air:

Three ambient air monitoring events were performed at the Site. No significant emissions of VOCs were detected outside of the work zones for the NTCRA. In addition, regular monitoring of the ambient air was performed during the NTCRA. The ambient air at the Site did not contain elevated levels of contaminants.

e. Fish and Mussels:

EPA retained the United States Fish and Wildlife Service (USFWS) to perform a biota sampling event to support the human health and ecological risk assessments. Fish and mussels from several locations in Meddybemps Lake, Dennys River and a reference site (East Machias River) were collected and analyzed for PCBs, metals, and pesticides. Figures 21 through 23 show the fish and mussel sample locations. Table 6 contains a summary of the fish and mussel data.

Mercury was detected at all locations, including background, supporting the area- wide problem discussed in the State of Maine fishing advisory. PCBs were detected at all locations with elevated levels detected adjacent to the Site. PCBs were detected at concentrations as high as 0.027 mg/kg in fillets and 0.168 mg/kg in whole body fish and up to 0.01 mg/kg in mussels. Arsenic, chromium, and copper were also detected at concentrations above background near the Site.

f. Cultural Resources:

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The Site contains pre-historic Native American artifacts dating back as far as 5,000 years before present. These artifacts are buried in the soils at the Site. The recent history (past several hundred years) have significantly disturbed much of the Site; however, portions of the Site were found to contain archaeological resources in a setting that would make the portions of the Site eligible for listing on the National Register of Historic Places. A qualified archaeologist was retained to perform an assessment of the Site. EPA used this technical expertise in combination with consultations with the Maine Historic Preservation Commission (which is the designated State Historic Preservation Officer in accordance with the National Historic Preservation Act (NHPA)) and the Passamaquoddy Tribe to guide the cleanup actions at the Site. EPA followed the requirements of the NHPA during the implementation of the NTCRA. Some archaeological resources were unavoidably affected as part of the excavation and off-site disposal of contaminated soils. Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, 16 U.S.C. § 470f, EPA will be performing archaeological mitigation activities as part of this ROD. These mitigation obligations have been memorialized in a Memorandum of Agreement for Recovery of Significant Information and Mitigation of Adverse Effect (MOA). The excavation portion of the mitigation requirements will be completed as part of the NTCRA. The long-term evaluation, documentation, and public outreach will be addressed as part of the ROD. Figure 24 shows the areas of the Site subject to major archaeological investigations. Figure 25 shows the portions of the Site that are National Register eligible.

2. Conceptual Site Model:

The sources of contamination, release mechanisms, exposure pathways to receptors for the groundwater, as well as other site-specific factors, are diagramed in a Conceptual Site Model (CSM). The CSM is a three-dimensional “picture” of Site conditions that illustrates contaminant sources, release mechanisms, exposure pathways, migration routes, and potential human and ecological receptors. It documents current and potential future Site conditions and shows what is known about human and environmental exposure through contaminant release and migration to potential receptors. The risk assessment and response action for the Site are based on this CSM, as described below.

The CSM for the Site identifies the drums, containers, and other stored material as the primary sources of contamination. The contamination was released into the soils due to dumping of liquids and by deterioration and leakage of containers. Much of the released hazardous substances entered the soils while some volatilized into the air. Precipitation and snow melt carried some of the contaminated soils into the surface water where deposition into the sediments occurred. Additionally, the contamination in the soils either drained due to gravity or was flushed by water into the overburden groundwater and eventually the bedrock groundwater. Site receptors including

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individuals and organisms: were in contact with containers and contaminated soils; ingested soil; may consume the groundwater; may come into contact with or ingest surface water or sediment; and may consume organisms that have accumulated contamination.

Principal threat wastes are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. The manner in which principal threats are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied. Wastes generally considered to be principal threats are liquid, mobile and/or highly-toxic source material. The principal threat wastes at the Site have been removed as a result of the previous removal actions. It is possible that some quantity of DNAPL has migrated into the bedrock system (although currently there are no indications of such). This would represent an additional principal threat.

Low-level threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. Wastes that are generally considered to be low-level threat wastes include non-mobile contaminated source material of low to moderate toxicity, surface soil containing chemicals of concern that are relatively immobile in air or groundwater, low leachability contaminants, or low toxicity source material. Low-level threat wastes present at the Site were removed as part of the previous removal actions that addressed the principal threat wastes.

The contamination remaining after the Site's earlier removal actions is found in groundwater, surface water, sediments, and biota. As mentioned above, with the possible exception of some quantity of DNAPL in the bedrock, there are no principal threat or low-level wastes remaining at the Site. The remaining contaminated media are the focus of this ROD.

F. CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

The most recent land use of the Site was as a junk yard/surplus materials storage. However, since the earlier removal actions have removed all surficial materials from the Site, the Site is presently an undeveloped well-graded lot located in the midst of an area of mixed land use. The Site is surrounded by permanent and seasonal homes surrounding Meddybemps Lake. The Site is situated in a location that would be considered a prime building lot but for the contamination.

Reasonably anticipated future uses of the Site are quite limited. Under the Consent Decree for the recovery of past and future Site costs from the potentially responsible parties (PRPs), the PRP owners of two parcels of property that represent the surficial extent of the Site will transfer ownership of their parcels to the State of Maine. The current groundwater contamination will require institutional controls to prevent consumption of groundwater during the time period required for restoration of the

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groundwater. Future excavation activities in the northern portion of the Site will also need to be restricted due to the presence of the archaeological resources. The State of Maine has agreed to accept ownership of the two parcels that represent the surficial extent of the Site and subsequently grant restrictions or covenants that run with the land to impose these institutional controls. The local community and Town of Meddybemps have expressed interests in having a park established given the scenic location of the Site and/or a conservation land for the preservation of the archaeological resources.

The parcel adjacent to the “surficial” Site, south of Route 191, also contains groundwater contamination. This area is not subject to the Consent Decree and therefore is not restricted and could have a number of future uses, including residential, commercial, or industrial uses. Reasonably anticipated future uses of adjacent land and in surrounding areas include mostly residential use with the possibility of some light commercial and agricultural uses. Blueberry fields are the major agricultural activity in the area.

The future land use assumptions for the Site and surrounding areas are based on current land use, the remote location of the Site, discussions with local officials, and the legal restrictions of the Site settlement.

The current uses of the groundwater at the Site and surrounding areas are for agricultural and residential purposes. The potential beneficial use of the groundwater at the Site could be as a water supply for maintaining a park. It is unlikely that the groundwater at the Site would be used as a water supply in the near future (30 years) given the planned land use restrictions. The areas surrounding the Site are dependent upon groundwater for residential and agricultural water. This is based on the lack of a public water supply and good quality bedrock aquifer.

The current use(s) of the surface water at the Site and surrounding areas are as a water supply, fishery, and for swimming and recreation. The potential beneficial use of the surface water at the Site and surrounding areas is the same. This is based on classification of Meddybemps Lake as a GPA surface water and the Dennys River as a Class AA river.

	Current On-Site Use	Current Adjacent Use	Reasonable Potential Beneficial Use of Site	Basis for Potential Beneficial Use	Time Frame to Achieve Potential Beneficial Use
Land	junk yard	residential, seasonal	recreational, conservation land	consent decree, land owner	present

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Shallow Groundwater	none	dug wells for water supply	non-potable water supply	geology, consent decree	present
Deep Groundwater	none	drilled wells for water supply	non-potable water supply	consent decree, ROD	present
Surface Water	fishing, seasonal water supply, swimming	fishing, seasonal water supply, swimming	fishing, seasonal water supply, swimming	current use	present

Community and stakeholder input was sought and incorporated through active outreach during the RI/FS. EPA held numerous meetings, held private discussions with local residents and Town Officials, and solicited the views of the PRPs. The local community performed a survey regarding future land use. The results were that, after cleanup of the Site, use of the land as a park or for a new church were the preferred activities.

G. SUMMARY OF SITE RISKS

A baseline risk assessment was performed to estimate the probability and magnitude of potential adverse human health and environmental effects from exposure to contaminants associated with the Site assuming no remedial action was taken. While the ecological risk assessment support a decision of no further remedial action, the results of the human health risk assessment provide the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The human health and ecological risk assessments followed a four step process: 1) hazard identification, which identified those hazardous substances which, given the specifics of the Site were of significant concern; 2) exposure assessment, which identified actual or potential exposure pathways, characterized the potentially exposed populations, and determined the extent of possible exposure; 3) effects assessment, which considered the types and magnitude of adverse effects associated with exposure to hazardous substances; and 4) risk characterization and uncertainty analysis, which integrated the three earlier steps to summarize the potential and actual risks posed by hazardous substances at the Site, including carcinogenic and non-carcinogenic risks and a discussion of the uncertainty in the risk estimates. A summary of those aspects of the human health risk assessment which support the need for remedial action is discussed below followed by a summary of the environmental risk assessment. It is important to note that the NTCRA resulted in the excavation and off-site disposal of the contaminated soils from the Site prior to the completion of the ROD. As such, only those soils outside the excavation areas were considered in the risk evaluation. As of November 1999, all soils above the NTCRA cleanup levels had been removed from the Site and the excavated

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areas have been filled with clean fill, graded, and seeded to promote vegetation and reduce erosion.

1. Human Health Risk Assessment

Of the 50 chemicals detected in the northern groundwater plume at the Site, 15 were chosen as chemicals of potential concern (COPCs) for evaluation in the human health risk assessment. For the southern groundwater plume, 15 of the 36 detected chemicals were selected as COPCs. COPCs were also selected for soil, sediments, surface water, and fish tissue. The COPCs were selected to represent potential site-related hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment and can be found in Tables 2.1 - 2.9 of the Human Health Risk Assessment. From this, a subset of the chemicals were identified in the Feasibility Study as presenting a significant current or future risk and are referred to as the chemicals of concern in this ROD and summarized in Tables 7 and 8. These tables contain the exposure point concentrations used to evaluate the reasonable maximum exposure scenario (RME) in the baseline risk assessment for the chemicals of concern. Estimates of average or central tendency exposure concentrations for the chemicals of concern and all chemicals of potential concern can be found in Tables 3.1 - 3.9 of the Human Health Risk Assessment.

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Table 7
Summary of Chemicals of Concern and
Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Future
Medium: Groundwater (northern plume)
Exposure Medium: Groundwater (northern plume)

Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration (EPC)	EPC Units	Statistical Measure
		Min	Max					
ingestion of ground-water	antimony	30	30	ug/l	1/16	9.0	ug/l	maximum of within well average concentrations
	arsenic	5	12	ug/l	3/17	4.4	ug/l	maximum of within well average concentrations
	chromium	1.2	61	ug/l	10/16	31	ug/l	maximum of within well average concentrations
	manganese	4.3	2,820	ug/l	17/17	1,510	ug/l	maximum of within well average concentrations
	bis (2-ethylhexyl) phthalate	2	5	ug/l	2/5	3.5	ug/l	maximum of within well average concentrations
	1,1,2 trichloroethane	11	11	ug/l	1/22	11	ug/l	maximum of within well average concentrations
	1,2 dichloroethene	2	170	ug/l	15/20	86	ug/l	maximum of within well average concentrations
	chloromethane	1	55	ug/l	3/22	55	ug/l	max
	methylene chloride	1	4,100	ug/l	9/22	4,100	ug/l	max
	tetrachloroethene	0.4	6,700	ug/l	20/22	4,000	ug/l	maximum of within well average concentrations
	trichloroethene	1	380	ug/l	16/22	185	ug/l	maximum of within well average concentrations

Key

ug/l: microgram per liter or parts per billion
95% UCL: 95% upper confidence limit
max: maximum concentration

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The table presents the chemicals of concern (COCs) and exposure point concentration for each of the COCs detected in groundwater (*i.e.*, the concentration that will be used to estimate the exposure and risk from each COC in the groundwater). The table includes the range of concentrations detected for each COC, as well as the frequency of detection (*i.e.*, the number of times the chemical was detected in the samples collected at the Site), the exposure point concentration (EPC), and how the EPC was derived. The table indicates that manganese and tetrachloroethene were the most frequently detected COCs in the northern plume groundwater at the Site. The maximum concentration of most COCs was based upon the temporal average concentrations at each well location.

Table 8
Summary of Chemicals of Concern and
Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Future
Medium: Groundwater (southern plume)
Exposure Medium: Groundwater (southern plume)

Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration (EPC)	EPC Units	Statistical Measure
		Min	Max					
ingestion of groundwater	arsenic	0.8	3.3	ug/l	4/29	2.6	ug/l	maximum of within well average concentrations
	cadmium	0.43	16	ug/l	4/29	4.4	ug/l	maximum of within well average concentrations
	chromium	1.1	92	ug/l	10/29	23.5	ug/l	maximum of within well average concentrations
	PCBs (total)	0.003	3.35	ug/l	5/8	3	ug/l	maximum of within well average concentrations
	bis (2ethyl hexyl) phthalate	1	190	ug/l	4/16	97.5	ug/l	maximum of within well average concentrations
	1,1 dichloroethene	3	3	ug/l	1/36	3	ug/l	max
	cis-1,3-dichloropropene	0.3	0.3	ug/l	1/36	0.3	ug/l	max
	methylene chloride	1	26	ug/l	6/36	15.5	ug/l	maximum of within well average concentrations
	tetrachloroethene	0.8	1,000	ug/l	36/36	965	ug/l	maximum of within well average concentrations

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	trichloroethene	0.4	100	ug/l	10/36	36.7	ug/l	maximum of within well average concentrations
Key ug/l microgram per liter or ppb: parts per billion 95% UCL: 95% upper confidence limit max: maximum concentration								
The table presents the chemicals of concern (COCs) and exposure point concentration for each of the COCs detected in groundwater (<i>i.e.</i> , the concentration that will be used to estimate the exposure and risk from each COC in the groundwater). The table includes the range of concentrations detected for each COC, as well as the frequency of detection (<i>i.e.</i> , the number of times the chemical was detected in the samples collected at the Site), the exposure point concentration (EPC), and how the EPC was derived. The table indicates that tetrachloroethene was the most frequently detected COC in the southern plume groundwater at the Site. The maximum concentration of most COCs was based upon the temporal average concentrations at each well location.								

Potential human health effects associated with exposure to the chemicals of potential concern were estimated quantitatively or qualitatively through the development of several hypothetical exposure pathways. These pathways were developed to reflect the potential for exposure to hazardous substances based on the present uses, potential future uses, and location of the Site. The Site is a junk/surplus salvage yard. The area surrounding the Site is mixed residential, seasonal recreational, agricultural, and undeveloped forest. There were no restrictions in place prior to the RI/FS that would have prevented future residential use of the land. The Site is located in a desirable location along Meddybemps Lake for future development and for recreational access to the Dennys River. The area is well known for the recreational fishery. Smallmouth bass and landlocked salmon are the most commonly sought game fish along with perch and pickerel.

The following is a brief summary of just the exposure pathways that were found to present a significant risk. A more thorough description of all exposure pathways evaluated in the risk assessment including estimates for an average exposure scenario can be found in Chapters 2 and 3 of the Human Health Risk Assessment.

For contaminated groundwater, ingestion of 2 liters/day, 350 days/year for 24 yrs was assumed for an adult. The same assumptions over a 6 year period was used for a child exposure. For dermal exposures to contaminated groundwater, it was assumed that an adult and child would contact groundwater while showering or bathing. For both a child and adult, the entire surface area was assumed to contact groundwater. The surface area exposed for an adult was 18,000 cm² and for a child was 6600 cm². The frequency and duration of exposure for an adult was 350 days/yr for 24 years. For a child, the frequency and duration was 350 days/yr for 6 years.

Excess lifetime cancer risks were determined for each exposure pathway by multiplying a daily intake level with the chemical specific cancer potency factor. Cancer potency factors have been developed by EPA from epidemiological or animal studies to reflect a conservative “upper bound”

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of the risk posed by potentially carcinogenic compounds. That is, the true risk is unlikely to be greater than the risk predicted. The resulting risk estimates are expressed in scientific notation as a probability (e.g., 1×10^{-6} or 1/1,000,000) and indicate (using this example), that an average individual is not likely to have greater than a one in a million chance of developing cancer over 70 years as a result of site-related exposure (as defined) to the compound at the stated concentration. All risks estimated represent an “excess lifetime cancer risk” - or the additional cancer risk on top of that which we all face from other causes such as cigarette smoke or exposure to ultraviolet radiation from the sun. The chance of an individual developing cancer from all other (non-site-related) causes has been estimated to be as high as one in three. EPA’s generally acceptable risk range for site-related exposure is 10^{-4} to 10^{-6} . Current EPA practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances.

A summary of the cancer toxicity data relevant to the chemicals of concern is presented in Table 9 below.

Table 9 Cancer Toxicity Data Summary						
Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence/Cancer Guideline Description	Source	Date (MM/DD/YYYY)
arsenic	1.5	1.5	(mg/kg)/day	A	IRIS	05/04/99
bis (2ethyl hexyl) phthalate	0.014	0.014	(mg/kg)/day	B2	IRIS	2/24/99
1,1 Dichloroethene	0.6	0.6	(mg/kg)/day	C	IRIS	03/21/99
1,1,2 trichloroethene	0.057	0.057	(mg/kg)/day	C	IRIS	03/21/99
chloromethane	0.013	0.013	(mg/kg)/day	C	HEAST	1997
methylene chloride	0.0075	0.0075	(mg/kg)/day	B2	IRIS	03/14/99
tetrachloroethene	0.052	0.052	(mg/kg)/day	B2	EPA-NCEA	03/21/99
trichloroethene	0.011	0.011	(mg/kg)/day	B2	EPA-NCEA	03/21/99
PCBs	2	2	(mg/kg)/day	B2	IRIS	03/03/99

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cis 1,3-dichloropropene	0.18	0.18	(mg/kg)/day	B2	HEAST	1997
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Key

— : No information available

IRIS: Integrated Risk Information System, U.S. EPA

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - Indicates that limited human data are available

B2 - Probable human carcinogen - Indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible Human Carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

This table provides carcinogenic risk information which is relevant to the contaminants of concern in groundwater. At this time, slope factors are not available for the dermal route of exposure. In the absence of dermal toxicity factors, EPA has devised a simplified paradigm for making route-to-route (oral-to-dermal) extrapolations for systemic effects. This process is outlined in Appendix A of the Risk Assessment Guidance for Superfund (U.S. EPA, 1989). Primarily, it accounts for the fact that most oral RfDs and slope factors are expressed as the amount of substance administered per unit time and body weight, whereas exposure estimates for the dermal pathway are expressed as an absorbed dose. To address this, EPA uses the dose-response relationship obtained from oral administration studies and makes an adjustment for gastrointestinal (GI) absorption efficiency to represent the toxicity factor in terms of an absorbed dose. If GI absorption is less than 50%, adjustment of the oral toxicity value is not recommended because this comparatively small adjustment impacts a level of accuracy that is not supported by the scientific literature. Slope factors for COCs detected at this Site do not need to be adjusted for absorption efficiency and thus oral slope factors are equal to dermal slope factors.

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In assessing the potential for adverse effects other than cancer, a hazard quotient (HQ) is calculated by dividing the daily intake level by the reference dose (RfD) or other suitable benchmark. Reference doses have been developed by EPA and they represent a level to which an individual may be exposed that is not expected to result in any deleterious effect. RfDs are derived from epidemiological or animal studies and incorporate uncertainty factors to help ensure that adverse health effects will not occur. A $HQ \leq 1$ indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (e.g. liver) within or across those media to which the same individual may reasonably be exposed. A $HI \leq 1$ indicates that toxic noncarcinogenic effects are unlikely. A summary of the noncarcinogenic toxicity data relevant to the chemicals of concern is presented in Table 10 below.

Table 10 Non-Cancer Toxicity Data Summary									
Pathway: Ingestion, Dermal									
Chemical of Concern	Chronic/ Sub-chronic	Oral RfD Value	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YYYY)
antimony	chronic	0.0004	mg/kg-day	0.00006	mg/kg-day	blood	1000	IRIS	02/23/1999
arsenic	chronic	0.0003	mg/kg-day	0.0003	mg/kg-day	skin	3	IRIS	05/04/1999
cadmium	chronic	0.001	mg/kg-day	0.000025	mg/kg-day	kidney	10	IRIS	05/21/1999
chromium	chronic	0.003	mg/kg-day	0.000075	mg/kg-day	kidney	900	IRIS	05/04/1999
lead	subchronic	NA	mg/kg-day	NA	mg/kg-day	CNS	NA	NA	NA
manganese	chronic	0.024	mg/kg-day	0.00144	mg/kg-day	CNS	1	IRIS	02/24/1999
bis(2ethyl hexyl) phthalate	chronic	0.02	mg/kg-day	0.02	mg/kg-day	liver	1000	IRIS	02/24/1999
1,1,2 trichloroethane	chronic	0.004	mg/kg-day	0.004	mg/kg-day	blood	1000	IRIS	03/21/1999
1,2 dichloroethene	chronic	0.009	mg/kg-day	0.009	mg/kg-day	liver	1000	HEAST	09/29/1998
1,1 dichloroethene	chronic	0.1	mg/kg-day	0.1	mg/kg-day	liver	1000	IRIS	03/21/1999

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ethylbenzene	chronic	0.1	mg/kg-day	0.1	mg/kg-day	liver/ kidney	1000	IRIS	03/21/1999
methylene chloride	chronic	0.06	mg/kg-day	0.06	mg/kg-day	liver	100	IRIS	03/14/1999
tetrachloro-ethene	chronic	0.01	mg/kg-day	0.01	mg/kg-day	liver	1000	IRIS	03/21/1999
trichloroethene	?	0.006	mg/kg-day	0.006	mg/kg-day	cardio/ liver/ CNS	?	EPA/ NCEA	03/21/1999
total PCBs	chronic	0.00002	mg/kg-day	0.00002	mg/kg-day	skin/eye	300	IRIS	03/14/1999
cis 1,3 dichloro-propene	chronic	0.0003	mg/kg-day	0.0003	mg/kg-day	kidney	10000	IRIS	03/21/1999
Key IRIS: Integrated Risk Information System, U.S. EPA NA: not applicable CNS: central nervous system HEAST: Health Effects Assessment Summary Tables EPA/NCEA: National Center for Environmental Assessment									
This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in groundwater. Oral RfDs (generally based on an administered dose) are adjusted for GI absorption efficiency to represent a toxicity factor which is based on an absorbed dose (called the Dermal RfD here). Absorption efficiency factors are presented in Table 5.1 and 6.1 of the Baseline Risk Assessment.									

Tables 11 and 12 depict the carcinogenic risk summary for the chemicals of concern in groundwater evaluated to reflect present and potential ingestion of the groundwater by future resident corresponding to the reasonable maximum exposure (RME) scenario. Tables 13-16 depict the non-carcinogenic risk summary for the chemicals of concern in groundwater evaluated to reflect present and potential ingestion of the groundwater by future resident corresponding to the reasonable maximum exposure (RME) scenario. Only those exposure pathways deemed relevant to the remedy being proposed are presented in this ROD. Readers are referred to Chapter 5 of the Human Health Risk Assessment for a more comprehensive risk summary of all exposure pathways evaluated for all chemicals of potential concern and for estimates of the central tendency risk.

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Table 11						
Risk Characterization Summary - Carcinogens						
Scenario Timeframe:		Future				
Receptor Population:		Resident				
Receptor Age:		Child/Adult				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk		
				Ingestion	Dermal	Exposure Routes Total
groundwater	groundwater	northern plume - tap water	arsenic	1.34 x 10 ⁻⁴	4.62 x 10 ⁻⁷	1.34 x 10 ⁻⁴
			bis (2-ethyl hexyl) phthalate	9.97 x 10 ⁻⁷	1.16 x 10 ⁻⁶	2.16 x 10 ⁻⁶
			1,1,2 trichloroethane	1.28 x 10 ⁻⁵	7.97 x 10 ⁻⁷	1.36 x 10 ⁻⁵
			chloromethane	1.46 x 10 ⁻⁵	2.79 x 10 ⁻⁷	1.48 x 10 ⁻⁵
			methylene chloride	6.26 x 10 ⁻⁴	1.57 x 10 ⁻⁵	6.42 x 10 ⁻⁴
			tetrachloroethene	4.23 x 10 ⁻³	1.5 x 10 ⁻³	5.73 x 10 ⁻³
			trichloroethene	4.14 x 10 ⁻⁵	4.31 x 10 ⁻⁶	4.57 x 10 ⁻⁵
			(Total)	5.06 x 10 ⁻³	1.52 x 10 ⁻³	6.58 x 10 ⁻³
Groundwater Risk Total =						6.58 x 10 ⁻³
Total Risk =						6.58 x 10 ⁻³
Key — : Toxicity criteria are not available to quantitatively address this route of exposure.						
This table provides risk estimates for the significant routes of exposure. These risk estimates are based on a reasonable maximum exposure and were developed by taking into account various conservative assumptions about the frequency and duration of a child and adult's exposure to groundwater, as well as the toxicity of the COCs. The total risk level is estimated to be 6.58 x 10 ⁻³ . This risk level indicates that if no clean-up action is taken, an individual would have an increased probability of 7 in 1000 of developing cancer as a result of site-related exposure to the COCs.						

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Table 12						
Risk Characterization Summary - Carcinogens						
Scenario Timeframe:		Future				
Receptor Population:		Resident				
Receptor Age:		Child/Adult				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk		
				Ingestion	Dermal	Exposure Routes Total
groundwater r	groundwater r	southern plume - tap water	arsenic	7.78 x 10 ⁻⁵	2.69 x 10 ⁻⁷	7.81 x 10 ⁻⁵
			total PCB congeners	1.25 x 10 ⁻⁴	7.77 x 10 ⁻⁴	9.02 x 10 ⁻⁴
			bis (2-ethyl hexyl) phthalate	2.78 x 10 ⁻⁵	3.23 x 10 ⁻⁵	6.0 x 10 ⁻⁵
			1,1 dichloroethene	3.66 x 10 ⁻⁵	3.35 x 10 ⁻⁶	4.0 x 10 ⁻⁵
			methylene chloride	2.37 x 10 ⁻⁶	5.94 x 10 ⁻⁸	2.43 x 10 ⁻⁶
			tetrachloroethene	1.02 x 10 ⁻³	3.62 x 10 ⁻⁴	1.38 x 10 ⁻³
			trichloroethene	8.22 x 10 ⁻⁶	8.54 x 10 ⁻⁷	9.07 x 10 ⁻⁶
			cis-1,3-dichloropropene	1.1 x 10 ⁻⁶	4.01 x 10 ⁻⁸	1.14 x10 ⁻⁶
			(Total)	1.30 x 10 ⁻³	1.18 x 10 ⁻³	2.48 x 10 ⁻³
Groundwater Risk Total =					2.48 x 10 ⁻³	
Total Risk =					2.48 x 10 ⁻³	
This table provides risk estimates for the significant routes of exposure. These risk estimates are based on a reasonable maximum exposure and were developed by taking into account various conservative assumptions about the frequency and duration of a child and adult’s exposure to groundwater, as well as the toxicity of the COCs. The total risk level is estimated to be 2.48 x10 ⁻³ . This risk level indicates that if no clean-up action is taken, an individual would have an increased probability of 3 in 1000 of developing cancer as a result of site-related exposure to the COCs.						

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Table 13							
Risk Characterization Summary - Non-Carcinogens							
Scenario Timeframe:		Future					
Receptor Population:		Resident					
Receptor Age:		Child					
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
groundwater r	groundwater r	northern plume - tap water	antimony	blood	2.92	0.0375	2.96
			arsenic	skin	1.87	0.00359	1.87
			chromium	kidney	1.34	0.206	1.54
			manganese	CNS	8.04	0.258	8.3
			1,2 dichloroethene	liver	1.22	0.0409	1.26
			methylene chloride	liver	8.74	0.122	8.86
			tetrachloroethene	liver	51.1	10.1	61.2
			trichloroethene	cardiovas / liver/CNS	3.94	0.228	4.17
			(Total)		79.2	11	90.2
Skin Hazard Index =						1.87	
Blood Hazard Index =						2.9	
CNS Hazard Index =						12.5	
Cardiovascular Hazard Index =						4.2	
Kidney Hazard Index =						1.5	
Liver Hazard Index =						75.5	
This table provides hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for all routes of exposure. The estimated HIs for most organ endpoints exceeds a hazard index of concern and indicates that the potential for adverse noncancer effects could occur from exposure to contaminated groundwater. CNS - central nervous system.							

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Table 14 Risk Characterization Summary - Non-Carcinogens							
Scenario Timeframe:		Future					
Receptor Population:		Resident					
Receptor Age:		Adult					
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
ground-water	ground-water	northern plume - tap water	manganese	CNS	1.72	0.151	1.87
			methylene chloride	liver	1.87	0.0713	1.94
			tetrachloroethene	liver	11	5.89	16.8
			(total)		14.6	6.11	20.7
CNS Hazard Index =						1.8	
Liver Hazard Index =						18.8	

Table 15 Risk Characterization Summary - Non-Carcinogens							
Scenario Timeframe:		Future					
Receptor Population:		Resident					
Receptor Age:		Child					
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
ground-water	ground-water	southern plume - tap water	arsenic	skin	1.09	0.00209	1.09
			cadmium	kidney	1.12	0.0432	1.17
			chromium	kidney	1	0.154	1.16
			total PCB congeners	skin/eye	19.6	67.9	87.5
			bis (2ethyl hexyl)phthalate	liver	0.623	0.403	1.03
			tetrachloroethene	liver	12.3	2.43	14.8
			(Total)		35.7	71.0	10.7
Skin Hazard Index =						88.6	

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Kidney Hazard Index =	2.32
Liver Hazard Index =	15.8
Eye Hazard Index =	87.5

Table 16 Risk Characterization Summary - Non-Carcinogens							
Scenario Timeframe:		Future					
Receptor Population:		Resident					
Receptor Age:		Adult					
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
groundwater r	groundwater r	southern plume - tap water	total PCB congeners	skin/eye	4.19	39.7	43.9
			tetrachloroethene	liver	2.64	1.42	4.07
			(Total)		6.84	41.1	48
Skin Hazard Index =						43.9	
Liver Hazard Index =						4.1	
Eye Hazard Index =						43.9	

Lead was identified as a COPC in groundwater from the southern plume (maximum concentration = 90 ug/L). The Integrated Exposure and Uptake Biokinetic (IEUBK) lead model was used to evaluate the hazard potential posed by exposure of young children less than 7 years of age to groundwater. The arithmetic mean of lead in the southern plume groundwater (3.81 ug/L) was used in the model along with the average Site surface soil lead concentration or the average Site subsurface soil lead concentration. For air and paint concentrations, default parameters were adopted. The default geometric standard deviation was also used. The outcome of the model revealed that 0.03% of children are expected to have blood-lead levels greater than 10 ug/dl under the scenario using the surface soil lead concentration. Under the scenario using the subsurface soil lead concentration, the IEUBK model estimates that 0% of children are expected to have blood-lead levels exceeding 10 ug/dl. It is EPA policy to protect 95% of the sensitive population against blood lead levels in excess of 10 ug/dl blood. The IEUBK results for this Site are well within acceptable levels.

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The only pathways which exceed EPA's acceptable cancer risk range and/or a hazard quotient of concern are ingestion of groundwater in the northern and southern plumes by a resident and ingestion of fish (due to mercury, which is not considered site-related). No unacceptable risks were identified for the remaining soils on-site, sediments, or surface water.

Lifetime cancer risk estimates for the northern plume groundwater are 6.6×10^{-3} . Eighty seven percent of this risk is due to tetrachloroethene. Methylene chloride contributes to about 9% of the total risk. EPA's hazard index of concern is exceeded for children and adults for several target organs. The major contributors to these exceedances are tetrachloroethene, methylene chloride and manganese. Antimony, 1,1,2-trichloroethane, methylene chloride, tetrachloroethene and trichloroethene exceed federal MCLs. Aluminum, iron, manganese, 1,1,2-trichloroethane, 1,1-dichloroethane, chloromethane, tetrachloroethene, trichloroethene and xylene exceed the Maine drinking water standards (Maine Maximum Exposure Guidelines (MEGs)).

The lifetime cancer risk estimates for the southern plume is 2.5×10^{-3} . Fifty-six percent of the risk is due to tetrachloroethene, and 36% is due to PCBs. EPA's hazard index of concern for children and adults is exceeded for several target organs. Most of this risk is due to PCBs and tetrachloroethene. For the southern plume, the following compounds exceed EPA's MCLs: cadmium, PCBs, bis(2-ethylhexyl)phthalate, methylene chloride, tetrachloroethene and trichloroethene. The following compounds exceed Maine MEGs: aluminum, cadmium, iron, manganese, PCBs, bis (2-ethylhexyl)phthalate, bromomethane, tetrachloroethene, and trichloroethene.

The lifetime cancer risk estimates for fish consumption was within the acceptable risk range (10^{-4} to 10^{-6}). The exposure pathways regarding fish consumption exceeded a hazard quotient of concern of one for only one contaminant (mercury). The hazard quotients for site-related contaminants (including PCBs) were all at or below a hazard quotient of one. Since the fish tissue concentrations for mercury were no different from background locations, the contamination is not considered site-related. The State of Maine has issued public health advisories regarding fish consumption in the lakes and streams of Maine due to mercury.

There are several uncertainties associated with any risk assessment. Some uncertainties bias risk estimates low while others bias risk high. EPA's general approach is to choose conservative but reasonable values for exposure variables so that true risks are unlikely to be higher than risks estimated by the baseline risk assessment. Below is a brief discussion of the major uncertainties associated with the risk assessment for this Site. A more complete discussion can be found in Chapter 6 of the Baseline Risk Assessment.

C Some of the analytical results used for the exposure point concentration in the risk assessment

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are isolated, elevated detections of chemical that may not be representative of the typical chemical concentration that a receptor is exposed to. For instance, some of the metals detected in groundwater and surface water samples may be the result of suspended solids and fines entrained in samples as a result of the sampling technique and thus not representative of true exposures. This uncertainty is likely to contribute to an overestimation of health risks.

- C The inclusion of estimated maximum possible concentration (EMPC) data introduces uncertainty. Sediment EMPC PCB results were included because of the limited number of samples. EMPC results could result in an over-or under-estimate of risk.
- C In evaluating potential risks associated with exposure to groundwater, the data sets were limited to groundwater samples that were located within a contaminant plume. This obviously reduces the size of the data set being evaluated and elevates the exposure point concentrations by eliminating the relatively unaffected samples from the data set. Exposure to groundwater is a point source exposure. Therefore, evaluating risks associated with the contaminated zone may overestimate risks to the typical receptor but reduce the likelihood of declaring the water safe for use when it may actually be unsafe for some users.
- C In evaluating potential risks associated with exposure to sediments, the data sets consisted of all sediment samples that were collected within specific areas. Most of the sediment samples were submerged, and it is unlikely that exposure to these sediment would result in significant direct contact exposure. However, potential risks due to sediments were evaluated as if they were soils. Therefore, the amount of exposure and risks due to the sediments are most likely overestimated.
- C For media at some study areas, fewer than ten samples were available. As a result, maximum values rather than 95% upper confidence limits on the mean were used for exposure point concentrations. This is likely to result in an overestimate of the concentration to which individuals are typically exposed and an overestimation of the risk since it is unlikely that an individual would be exposed to the maximum concentration over the entire exposure period.

2. Ecological Risk Assessment

The objective of the ecological risk assessment was to identify and estimate the potential ecological impacts associated with the chemicals of concern (COCs) at the Site. The assessment focused on the potential impacts of chemicals of concern found in the surface soils, surface waters, sediments and fish and mussel tissues to aquatic and semiaquatic birds and mammals that inhabit or are potential inhabitants of the Site, which includes Meddybemps Lake, Mill Pond and the Dennys River. Readers are referred to the Final Ecological Risk Assessment (Weston, 1999) for a more comprehensive risk summary of all exposure pathways and estimates. The technical guidance for

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performance of the ecological risk assessment comes primarily from the following sources: *Framework for Ecological Risk Assessment* (U.S. EPA, 1992), the *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (U.S. EPA, 1997); and the *Guidelines for Ecological Risk Assessment* (U.S. EPA, 1998).

Risks were evaluated through the comparison of site-related contaminants detected in Site media to media-specific ecological effect levels, which are defined as the concentration of a particular contaminant in a particular medium below which no adverse effects to ecological receptors are likely to occur. Ecological effect levels were developed based on established numerical criteria (e.g., federal and state Ambient Water Quality Criteria (AWQC)) or on information obtained from the literature (Long *et al.*, 1995; Persaud *et al.*, 1996; and Ingersoll *et al.*, 1996). These effect levels can be used to assess potential risks to ecological receptors by comparing the effect levels to existing contaminant levels in the on-site media. In addition, fish and mussel tissue data were collected at areas potentially impacted by the migration of site-related contaminants since both Meddybemps Lake and the Dennys River maintain active fisheries. The fish and mussel data were incorporated into quantitative exposure modeling for the great blue heron, osprey and river otter.

Media that were investigated as part of this remedial investigation included the surface waters, groundwater, surface sediments, surface soils, and fish and mussel tissues. Based on likely exposure pathways, as described in Section 3.2.2 of the Ecological Risk Assessment (Weston, 1999), for species observed or expected to occur at the Site, the following media and biota are of potential concern to ecological resources:

- Surface soils at the Site,
- Surface waters, sediments and fish and mussel tissues within Meddybemps Lake and the Denny River.

a. Identification of Chemicals of Concern

Both the RI and ERA were conducted based upon sampling performed by Roy F. Weston in 1996 and 1997, and monitoring data collected by Tetra Tech NUS in 1998 and completed in July of 1999. Additional data was collected in the summer of 1999 (Tetra Tech NUS, 1999), subsequent to the RI and ERA reports, as part of ongoing monitoring at the Site. Also, during the summer of 1999, a non-time-critical removal action (NTCRA) took place, which included the excavation and off-site disposal of surface soils and sediments contaminated with polychlorinated biphenyls (PCBs) and VOCs. Some additional samples were taken in the

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excavated area and analyzed for PCBs in September of 1999 (Tetra Tech NUS, 1999).

Data from 1996-1997 and 1999 were pooled to calculate mean concentration (AVG), standard deviation (STD), maximum, and 95% upper confidence limits (UCL). Data were grouped by medium: surface water, sediment and soil.

The following criteria were used to summarize the data:

- All J-qualified data were assumed to be valid data.
- All U-qualified data represented non-detect data for the parameters evaluated, and one-half of the sample quantitation limit was used to estimate the statistical parameters (AVG, STD and UCL).
- Maximum values were calculated using only detected concentrations (this occasionally resulted in a maximum value that was less than the mean).
- Sample duplicates were treated as separate individual samples.

Tables 17 through 26 identify the revised list of COCs for surface water and sediment within Meddybemps Lake, Mill Pond and Dennys River and surface soil at the Site based on sampling performed prior to 1999, and sampling performed in the summer and fall of 1999 following the NTCRA. Table 27 provides a summary of the benchmark concentrations used for each media. The following is a discussion of the revised list of COCs.

Table 17 Distribution and Selection of Chemicals of Concern (COC), Meddybemps Lake Surface Water									
COC (ug/L)	Background Samples		Meddybemps Lake Samples			Benchmark ug/L	Benchmark Reference	Max > Benchmark	UCL > Benchmar k
	Average	95% UCL	Maximum	Average	95% UCL				
Aluminum	43	66	852	283	577	87	a	Y	Y
Barium	2.02	2.51	5.90	2.94	4.49	4.00	b	Y	Y
Lead	0.67	0.93	3.50	2.38	3.31	0.50	a	Y	Y
Silver	0.98	1.42	1.10	0.89	1.25	0.36	b	Y	Y
a - benchmarks from Maine Statewide Water Quality (1998) - Endpoint = CCC; values of certain metals adjusted to hardness of 25 mg/L									

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b - benchmarks from Suter and Tsao (1996) - Endpoint = Second Chronic Values (Tier II)

NA - Not Available

NE - Not Evaluated

Y - Yes

N - No

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Table 18
Data Comparison: Meddybemps Lake Surface Water

COC (ug/L)	1996-1997 Surface Water		1999 Surface Water	
	Average (1)	Max (2)	Average (1)	Max (2)
Aluminum	523	852	43	51
Barium	4.38	5.90	1.50	ND
Lead	2.15	3.50	2.60	3.2
Silver	0.82	ND	0.80	1.1

Notes:

(1) Average is the arithmetic mean of all samples in the group, using 1/2 the listed detection limit for non-detects.

(2) Maximum is the maximum detected concentration within the sample group.

NA indicates that the chemical was not included in analysis for the sample.

ND - Not detected in the sample group. Average values in such cases are driven by 1/2 the detection limit.

Table 19
Distribution and Selection of Chemicals of Concern (COC)
Dennys River/Mill Pond Surface Water

COC (ug/L)	Background Samples		Dennys River/Mill Pond Samples			Benchmark ug/L	Benchmark Reference	Max > Benchmark	UCL > Benchmark
	Average	95% UCL	Maximum	Average	95% UCL				
Trichloroethene	ND	ND	65	5.39	11	47	a	Y	N
bis (2-Ethylhexyl) phthalate	4.33	10	480	24	60	360	b	Y	N
Copper	1.6	2.09	3.70	0.95	1.27	2.36	b	Y	N
Selenium	2.15	2.86	10.00	2.55	3.25	5	b	Y	N

Notes:

a - benchmarks from Suter and Tsao (1996) - Endpoint = Second Chronic Values (Tier II)

b - benchmarks from Maine Statewide Water Quality (1998) - Endpoint = CCC; values of certain metals adjusted to hardness of 25 mg/L

Y- Yes

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N- No

Table 20
Data Comparison: Mill Pond Surface Water

COC (ug/L)	1997 Surface Water		1999 Surface Water	
	Average (1)	Max (2)	Average (1)	Max (2)
Trichloroethene	18.5	65	0.50	ND
bis(2-Ethylhexyl)phthalate	100	480	5.00	ND
Copper	2.02	3.70	0.47	0.8
Selenium	1.86	ND	3.06	10.00

Notes:

(1) Average is the arithmetic mean of all samples in the group, using 1/2 the listed detection limit for non-detects.

(2) Maximum is the maximum detected concentration within the sample group.

NA indicates that the chemical was not included in analysis for the sample.

ND - Not detected in the sample group. Average values in such cases are driven by 1/2 the detection limit.

Table 21
Data Comparison: Dennys River Surface Water

COC (ug/L)	1996-1997 Surface Water		1999 Surface Water	
	Average (1)	Max (2)	Average (1)	Max (2)
Trichloroethene	5.00	ND	0.50	ND
bis(2-Ethylhexyl)phthalate	5.00	ND	5.00	ND
Arsenic	2.55	3	1.50	ND
Copper	1.60	ND	0.40	ND
Selenium	1.84	ND	2.40	3.90

Notes:

(1) Average is the arithmetic mean of all samples in the group, using 1/2 the listed detection limit for non-detects.

(2) Maximum is the maximum detected concentration within the sample group.

NA indicates that the chemical was not included in analysis for the sample.

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ND - Not detected in the sample group. Average values in such cases are driven by 1/2 the detection limit.

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Table 22
Distribution and Selection of Chemicals of Concern (COC)
Meddybemps Lake Sediments

COC	Units	Background Samples		Meddybemps Lake Samples			Benchmark ug/kg	Benchmark Reference	Max > Benchmark	UCL > Benchmark
		Average	95% UCL	Maximum	Average	95% UCL				
Methoxychlor	ug/Kg	ND	ND	78	19	35	19	a	Y	Y
Arsenic	mg/Kg	7.11	75.7	25	15	19	6	b	Y	Y
Copper	mg/Kg	10.1	140	21	18	20	16	b	Y	Y
Manganese	mg/Kg	213	522	1,080	457	685	460	b	Y	Y
Nickel	mg/Kg	16.8	35.7	32	26	28	16	b	Y	Y

Notes:

a - benchmarks from Ingersoll et al. (1996) - endpoint = NEC

b - benchmarks from Jaagumagi (1995) - endpoint = Lowest Effect Level

Y - Yes N - No

ND - chemical was not detected in any background sample

Table 23
Data Comparison: Meddybemps Lake Sediments

COC	Units	1996-1997 Sediment Data		1999 Sediment Data	
		Average (1)	Max (2)	Average (1)	Maximum (2)
Methoxychlor	mg/Kg	26	78	8	ND
Arsenic	mg/Kg	11	16	19	25
Copper	mg/Kg	17	21	18	20
Manganese	mg/Kg	283	390	689	1,080
Nickel	mg/Kg	24	28	28	32

Notes:

(1) Average is the arithmetic mean of all samples in the group, using 1/2 the listed detection limit for non-detects.

(2) Maximum is the maximum detected concentration within the sample group.

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ND - Not detected in the sample group. Average values in such cases are driven by 1/2 the detection limit.

Table 24
Distribution and Selection of Chemicals of Concern (COC)
Dennys River/Mill Pond Sediments

COC	Units	Background Samples		Dennys River/Mill Pond Samples			Benchmark ug/kg	Benchmark Reference	Max > Benchmark	UCL > Benchmark
		Average	95% UCL	Max	Average	95% UCL				
Benzo(a)anthracene	ug/Kg	250	379	620	279	346	320	a	Y	Y
Benzo(a)pyrene	ug/Kg	ND	ND	640	296	360	370	a	Y	N
Benzo(g,h,i)perylene	ug/Kg	ND	ND	420	285	333	170	a	Y	Y
Benzo(k)fluoranthene	ug/Kg	267	356	510	278	336	240	a	Y	Y
Fluoranthene	ug/Kg	273	364	1,100	427	558	750	a	Y	N
Indeno(1,2,3-cd)pyrene	ug/Kg	ND	ND	380	274	323	200	a	Y	Y
Phenanthrene	ug/Kg	249	399	750	304	389	560	a	Y	N
Pyrene	ug/Kg	271	361	1,600	469	662	490	a	Y	Y
Dieldrin	ug/Kg	3.86	7.7	5.30	2.62	3.12	2	a	Y	Y
Endrin	ug/Kg	ND	ND	9.00	3.26	3.98	3	a	Y	Y
Sum of PCB Homologs	ug/Kg	0.78	1.44	NC	202	315	190	b	NC	Y
Arsenic	mg/Kg	7.11	75.7	30	13	15	6	a	Y	Y
Chromium	mg/Kg	18.3	31.2	45	24	27	26	a	Y	Y
Copper	mg/Kg	10.1	140	22	12	14	16	a	Y	N
Lead	mg/Kg	22.7	1,020	65	19	24	31	a	Y	N
Manganese	mg/Kg	213	522	598	287	335	460	a	Y	N
Nickel	mg/Kg	16.8	35.7	67	28	33	16	a	Y	Y

Notes:

a- benchmarks from Jaagumagi (1995) - endpoint = Lowest Effect Level

b- benchmarks from Ingersoll et al. (1996) - endpoint = NEC

Y- Yes

N- No

NC - value was not calculated because the maximum values for individual PCB homologues were not all found within a single

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sample.

ND - chemical was not detected in any background sample.

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Table 25
Data Comparison: Mill Pond Sediments

	Units	1996 Sediment Data		1999 Sediment Data	
		Average (1)	Max (2)	Average (1)	Max (2)
Benzo(a)anthracene	ug/Kg	319	ND	103	28
Benzo(a)pyrene	ug/Kg	319	ND	138	ND
Benzo(g,h,i)perylene	ug/Kg	319	ND	138	ND
Benzo(k)fluoranthene	ug/Kg	319	ND	138	ND
Fluoranthene	ug/Kg	319	ND	106	39
Indeno(1,2,3-cd)pyrene	ug/Kg	319	ND	138	ND
Phenanthrene	ug/Kg	319	ND	138	ND
Pyrene	ug/Kg	319	ND	113	59
Dieldrin	ug/Kg	3.53	5.3	1.38	ND
Endrin	ug/Kg	3.19	ND	2.33	4.3
Total PCB Homologs (max) (3)	ug/Kg	?	1.20	?	1,140.23
Arsenic	mg/Kg	10.6	29.5	16.1	22.3
Chromium	mg/Kg	23.30	38.2	27.48	44.8
Copper	mg/Kg	7.61	14.4	14.26	20.3
Lead	mg/Kg	21.67	64.9	12.38	16.1
Manganese	mg/Kg	219	298	438	598
Nickel	mg/Kg	21.55	31.5	33.08	67.0

Notes:

(1) Average is the arithmetic mean of all samples in the group, using 1/2 the listed detection limit for non-detects.

(2) Maximum is the maximum detected concentration within the sample group.

(3) Value is the sum of maximum homolog values within the sample group, not the sum of homologs for any individual sample.

ND - Not detected in the sample group. Average values in such cases are driven by 1/2 the detection limit.

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Table 26
Distribution and Selection of Chemicals of Concern (COC)
Site Soils

COC	Units	Background Samples		Site Soils			Benchmark mg/kg	Benchmark Reference	Max > Benchmark	UCL > Benchmark
		Average	95% UCL	Maximum	Mean	95% UCL				
Aluminum	mg/kg	13600	15000	17600	NC	NC	1700	a	Y	NE
Arsenic	mg/kg	14.8	17	43	17	35.8	9.9	b	Y	Y
Barium	mg/kg	50.9	77.1	563	61.3	130.8	283	b	Y	N
Cadmium	mg/kg	ND	ND	13.2	1.22	4.1	4	b	Y	Y
Chromium	mg/kg	21.6	21.9	145	30.7	64.5	0.4	b	Y	Y
Copper	mg/kg	12	20.9	144	NC	NC	60	b	Y	NE
Lead	mg/kg	14.7	18.4	146	NC	NC	40.5	b	Y	NE
Mercury	mg/kg	ND	ND	0.33	NC	NC	0.00051	b	Y	NE
Nickel	mg/kg	16	18.4	31	NC	NC	30	b	Y	NE
Selenium	mg/kg	0.613	21.3	1.1 J??	NC	NC	0.21	b	Y	NE
Thallium	mg/kg	ND	ND	1.1 J??	0.472	1.009	1	b	Y	Y
Vanadium	mg/kg	32.8	41.3	37.3	NC	NC	2	b	Y	NE
Zinc	mg/kg	82.9	174	430	NC	NC	8.5	b	Y	NE

Notes:

a- ABB Environmental Services, Inc. 1992

b - Preliminary Remediation Goals for Ecological Endpoints, Efroymsen et al. 1997

NA - Not Available

NC - Not calculable - insufficient detected data to calculate value.

NE - Not Evaluated

Y- Yes

N- No

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Table 27 COC Concentrations Expected to Provide Adequate Protection of Ecological Receptors for Surface Water and Sediment						
Habitat Name/ Type	Exposure Medium	COC	Protective Level	Units	Basis	Assessment Endpoint
Lake, Pond, or River Meddybemps Lake Mill Pond Dennys River	Surface Water	Aluminum	87	ug/L	a	Maintenance of healthy freshwater
		Arsenic				pelagic community
		Barium	4	ug/L	b	
		Lead	0.5	ug/L	a	
		Silver	0.36	ug/L	b	
	Sediment	Benzo(a)anthracene	320	ug/kg	c	Maintenance of invertebrate community species diversity and abundance
		Benzo(a)pyrene	370	ug/kg	c	
		Benzo(g,h,i)perylene	170	ug/kg	c	
		Benzo(k)fluoranthene	240	ug/kg	c	
		Fluoranthene	750	ug/kg	c	
		Indeno(1,2,3-cd)pyrene	200	ug/kg	c	
		Phenanthrene	560	ug/kg	c	
		Pyrene	490	ug/kg	c	
		Dieldrin	2	ug/kg	c	
		Endrin	3	ug/kg	c	
		Methoxychlor	19	ug/kg	d	
		Sum of PCB Homologs	190	ug/kg	d	
		Arsenic	6	mg/kg	c	
		Chromium	26	mg/kg	c	
		Copper	16	mg/kg	c	
		Lead	31	mg/kg	c	
		Manganese	460	mg/kg	c	
		Nickel	16	mg/kg	c	
		Lead	31	mg/kg	c	
		Manganese	460	mg/kg	c	
		Nickel	16	mg/kg	c	

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Notes:

a - benchmarks from Maine Statewide Water Quality (1998) - Endpoint = CCC; values of certain metals adjusted to hardness of 25 mg/L

b - benchmarks from Suter and Tsao (1996) - Endpoint = Second Chronic Values (Tier II)

c - benchmarks from Jaagumagi (1995) - endpoint = Lowest Effect Level

d - benchmarks from Ingersoll et al. (1996) - endpoint = NEC

Data from PCB congener and dioxin/furan analyses were used to determine 2,3,7,8 - TCDD toxic equivalency (TEQ) concentrations by using toxic equivalence factors (TEFs) for polychlorinated dibenzodioxins and dibenzofurans (dioxins/furans) and PCBs to relate the toxic potency of the various congeners to 2,3,7,8 -TCDD. TEQs were calculated only for mammals and birds, and the TEFs used to adjust dioxin and furan concentrations can be found in U.S. EPA, 1998.

Surface water samples taken from the Meddybemps Lake site revealed four chemicals with maximum concentrations and 95% UCLs greater than benchmark values (Table 17). These COCs are aluminum, barium, lead, and silver. Aluminum, barium and lead were detected at lower concentrations in 1999 than the previous sampling round in 1996/1997 (Table 18). It should be noted that silver has not been widely detected at the site, and this single detection may not be accurate because of the noted blank contamination. The average and 95% UCL for silver was greater than the benchmark in the background samples.

Trichloroethene, bis(2-ethylhexyl)phthalate, copper, and selenium maximum concentrations were greater than corresponding benchmark values (Table 19) and were identified as COCs within Mill Pond and the Dennys River surface waters. However, none of the 95% UCLs for those four COCs were higher than the benchmark values. In general, concentrations for those compounds was lower in 1999 with the exception of selenium (Tables 20 and 21).

Maximum and 95% UCLs for methoxychlor, arsenic, copper, manganese and nickel concentrations in sediments within Meddybemps Lake were higher than benchmark values (Table 22). Methoxychlor was detected at lower concentrations in sediments in 1999 (Table 23). Arsenic, copper, manganese and nickel were detected in sediments collected at the background locations.

Table 24 lists the 17 sediment COCs for the Dennys River and Mill Pond that include: benzo(a)anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, dieldrin, endrin, arsenic, chromium, copper, lead, manganese, nickel, zinc, and total PCBs. The majority of these COCs were detected at lower concentrations in 1999 (Table 25).

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13 COCs were identified in surface soil at the Site, including: aluminum, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, vanadium, and zinc. The 95% UCL only exceeded the benchmark values for arsenic, cadmium, chromium, and thallium (Table 26).

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b. Exposure Assessment

Data which were incorporated into the ecological setting of the Site came from several sources, including: interviews with local residents, discussions with regional state and federal wildlife and fisheries biologists, observations from a September 1997 Site visit, and a review of flora and fauna from this region of Maine with special emphasis on the information of natural resources from the Moosehorn National Wildlife Refuge, which borders the southeastern portion of Meddybemps Lake. The discussion of the ecological setting associated with the Site is separated into two sections: Terrestrial Habitat and Wildlife; and Meddybemps Lake and Dennys River Aquatic Life.

The terrestrial portion of the Site covers approximately 5 acres and is bordered generally by Meddybemps Lake to the north, the Dennys River to the east, Route 191 to the south, and Stone Road to the west. The Site vegetation consists of an interspersed mix of secondary growth deciduous and coniferous forest patches and early successional herbaceous fields. The surplus disposal yard and terrestrial habitats bordering the Dennys River downstream from the Site provide suitable foraging areas for a variety of wildlife species. The bald eagle, a state and federally listed threatened species, has been occasionally observed foraging in Meddybemps Lake and along the Dennys River. In addition, osprey also forage in these areas and maintain a nest on the southern portion of Meddybemps Lake.

Meddybemps Lake and the Dennys River both support active recreational fisheries, provide excellent habitat for numerous aquatic species, and serve as water and food sources for wildlife. The Dennys River, originating from Meddybemps Lake directly adjacent to the Site, is currently monitored and managed to protect and restore the Atlantic salmon (*Salmo salar*) fisheries. Other migratory fish species that utilize the Dennys River include: American eel (*Anguilla rostrata*), alewife (*Alosa pseudoharengus*), and American shad (*Alosa sapidissima*).

During the RI, fish and mussels were collected in September 1997 by the U.S. Fish and Wildlife Service from the Meddybemps Lake and the Dennys River for tissue analysis. Fish species collected were: brook trout (*Salvelinus fontinalis*), pumpkinseed (*Lepomis gibbosus*), smallmouth bass (*Micropterus dolomieu*), and white sucker (*Catostomus commersoni*). Mussel species collected include the Eastern Elliptio (*Elliptio complanata*) and Alewife Floater (*Anadonta imiplicata*). The East Machais River was selected as the reference area for fish and mussel tissue. In September 1997, the State of Maine conducted a benthic community assessment in the Dennys River. The brook floater (*Alasmidonta varicosa*), a freshwater mussel listed as a special concern species in Maine, has been found in the Dennys River.

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Within the exposure assessment, the potential exposure pathways for various species groups, such as fish, shellfish, mammals, and birds, were directly or indirectly evaluated to determine those considered to be at risk of significant exposure from Site contaminants. Table 28 lists the exposure media, habitat types, receptors, exposure routes, and assessment and measurement endpoints for selected species groups for which a potential exposure pathway has been identified and for which quantitative data exist. For this assessment, avian and mammalian species (e.g., great blue heron, osprey and river otter) had the greatest potential for exposure and were selected for a quantitative evaluation of exposure. The potential for biomagnification was evaluated by including receptors that typically ingest species for which tissue concentrations were assessed (e.g., fish and shellfish).

The river otter was assumed to be exposed to COCs through the ingestion of chemicals in mussels (site-specific data) and fish (site-specific data), ingestion of surface water and incidental ingestion of sediments within Meddybemps Lake and the Dennys River. The osprey was assumed to be exposed to chemicals of concern through the ingestion of fish (site-specific data) and ingestion of surface water from Meddybemps Lake and the Dennys River. The great blue heron was assumed to be exposed to chemicals of concern through the ingestion of fish (site-specific data) and surface water from Meddybemps Lake, Mill Pond and the Dennys River. In addition, it was assumed that the great blue heron would incidentally ingest sediments during feeding.

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Table 28 - Ecological Exposure Pathways of Concern						
Exposure Medium	Sensitive Environment Flag (Y or N)	Receptor	Endangered / Threatened Species Flag (Y or N)	Exposure Routes	Assessment Endpoints	Measurement Endpoints
Surface Water	N	Fish	N	Ingestion, respiration, and direct contact with chemicals in surface water	Maintenance of an abundant and productive game fish population	Comparison of chemical concentrations in surface waters to criteria values
		Mussels	N	Ingestion, respiration, and direct contact with chemicals in surface water	Maintenance of an abundant mussel population	Comparison of chemical concentrations in surface waters to criteria values
Surface Water	N	Mussels	N	Ingestion, respiration, and direct contact with chemicals in surface water	Maintenance of an abundant mussel population	Comparison of chemical concentrations in surface waters to criteria values
Sediment	N	Benthic organisms	N	Ingestion, respiration, and direct contact with chemicals in sediment	Benthic invertebrate community species diversity and abundance	Comparison of chemical concentrations in sediments to guidance values
Soil	N	Terrestrial invertebrates	N	Ingestion and direct contact with chemicals in soils	Survival of terrestrial invertebrate community	Comparison of chemical concentrations in soils to guidance values
		Terrestrial plants	N	Direct contact with chemicals in soils	Survival of terrestrial plant community	Comparison of chemical concentrations in soils to guidance values
Fish and Mussels	N	Piscivorous birds and mammals	N	Ingestion of chemicals in fish and mussels and indirect ingestion of chemicals in surface water and sediment	Survival, reproduction and growth of piscivorous birds and mammals	Comparison of chemicals in fish tissue to published database values and avian and mammalian exposure modeling

c. Ecological Effects Assessment

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Information on the toxicity of the chemicals of concern to the benthic organisms, fish, birds, and mammals was summarized in the toxicity assessment of the ecological risk assessment (Weston, 1999). Species-specific toxicity data for the indicator avian and mammalian species (great blue heron, osprey, and river otter) were not available for all of the chemicals of potential concern. Thus, toxicity values from the literature were selected using the most closely related species. Toxicity values selected for the assessment were the lowest exposure doses reported to be toxic or the highest doses associated with no adverse effect. Data for chronic toxicity were preferentially used, when available. These toxicity values were compared with the estimated dietary dose of each COC received by the great blue heron, osprey and river otter to determine the potential adverse effects from predicted exposures.

In addition, the toxicity of chemicals of concern to aquatic life was assessed by comparing average and maximum surface water concentrations in Meddybemps Lake and the Dennys River to the federal freshwater acute and chronic AWQC and Maine Statewide Water Quality Criteria, where available. The toxicity of the chemicals of concern identified in Meddybemps Lake and the Dennys River sediments to benthic and epibenthic organisms was evaluated by comparing sediment contaminant concentrations to the Ontario Ministry of Environment and Energy Sediment Quality Guidelines (Persaud *et al.*, 1996), the NOAA biological effect ranges (Long *et al.*, 1995), and the sediments effect concentrations (Ingersoll *et al.*, 1996), along with predicting the interstitial water contaminant concentrations through the use of the equilibrium partitioning approach and comparing those values to AWQC. Potential ecological effects associated with soil contamination were evaluated by comparing COC concentrations in soils to the lowest of the Oak Ridge National Laboratory soil toxicological benchmarks for plants, earthworms or wildlife (Sample, 1996 and Efroymson *et al.*, 1997).

Chemical concentrations detected in fish collected from Meddybemps Lake and the Dennys River were compared to a database of aquatic species tissue residues (Jaravinen and Ankley, 1999).

d. Ecological Risk Characterization

The potential risks posed to ecological receptors (great blue heron, osprey, river otter, benthic invertebrates and fish) were evaluated by comparing estimated daily doses or medium-specific concentrations with critical toxicity values as discussed in Section 4.2 of the Ecological Risk Assessment (Weston, 1999). This comparison, described as a Hazard Quotient (HQ), was made for each chemical. If the HQ exceeds unity (e.g., > 1), this indicates that the species may be at risk to an adverse effect from the chemical through the identified exposure route.

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For the great blue heron and osprey exposed to contaminants in Meddybemps Lake and Mill Pond, HQs were greater than one for total PCBs and mercury (see Table 4-18 and 4-19 in the ERA). HQs were greater than one for total PCBs (HQ=2.63), mercury (HQ=6.35) and aluminum (HQ=2.39) for the great blue heron and osprey exposed to contaminants in the Dennys River (see Tables 4-21 and 4-22 in the ERA). The ingestion of fish contributes to almost 100% of the HQ.

For the river otter, HQs are presented in Tables 4-20 and 4-23 in the ERA (Weston 1999), and the three contaminants contributing to the majority of the HQ were total PCBs (HQ=2.33) and mercury (HQ=1.03) for Meddybemps Lake and Mill Pond, and total PCBs (HQ=5.73), aluminum (HQ=129), lead (HQ=222) and mercury (HQ=1.02) for the Dennys River.

In the fish tissue analysis conducted by Mierzykowski *et al.* (1999), PCB concentrations were significantly higher in bass collected from Meddybemps Lake and the Dennys River near the Site. However, these concentrations were not considered elevated when compared with regional, state or national data (Mierzykowski *et al.*, 1999). No other contaminants were detected at elevated levels in either fish or mussels collected near the Site.

Given the magnitude in which the HQ exceeds unity and the detection of these contaminants in fish collected from reference locations, it is unlikely that contaminant residues in fish or mussels would be responsible for an adverse impact to piscivorous birds or mammals, such as the river otter, osprey and great blue heron.

Based on all the surface water sampling rounds that were conducted for Meddybemps Lake during the RI and following the NTCRA, the 95% UCLs for aluminum, barium, lead, and silver exceeded the benchmarks. However, the 95% UCLs for barium and silver at the background location were similar to concentrations detected in surface waters collected from Meddybemps Lake. In addition, the average and maximum surface water concentrations of these COCs were detected at lower concentrations from the 1999 sampling round than the 1996/1997 sampling round. Surface water results from the Dennys River and Mill Pond identified trichloroethene, bis (2-ethylhexyl)phthalate, copper and selenium as COCs. However, the 95% UCLs for copper and selenium at the background locations were similar to concentrations detected in surface water from the Dennys River and Mill Pond. Average and maximum COC surface water concentrations were detected at lower concentrations from the 1999 sampling round than the 1996/1997 sampling round with the exception of selenium. Given the magnitude by which the criteria were exceeded, the detection of barium, silver, copper, and selenium at background locations, and the confirmation of lower contaminant concentrations from the 1999 sampling round, it is unlikely that direct exposure of aquatic

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organisms to aluminum, lead, trichloroethene, and bis (2-ethylhexyl)phthalate in Meddybemps Lake, Mill Pond and the Dennys River will result in significant adverse aquatic ecological effects.

Based on the sediment sampling conducted in Meddybemps Lake during the RI and following the NTCRA, the 95% UCLs for arsenic, copper, manganese, methoxychlor, and nickel exceeded ecological effects benchmarks. However, the 95% UCLs for arsenic, copper, manganese, and nickel were greater than or similar to concentrations detected in Meddybemps Lake sediments. Furthermore, the average and maximum concentrations of methoxychlor in sediments collected in 1999 were detected at a lower concentration than the 1996/1997 sampling round. Sediment concentrations of arsenic, copper and nickel were detected at similar concentrations during the 1996/1997 and 1999 sampling rounds with the exception of manganese that was detected at a greater concentration in the 1999 sampling round. Sediment sampling results from the Dennys River and Mill Pond identified the following 17 COCs: benzo(a) anthracene; benzo(a)pyrene; benzo(g,h,i)perylene; benzo(k)fluoranthene; fluoranthene; indeno(1,2,3-cd)pyrene; phenanthrene; pyrene; dieldrin; endrin; PCBs; arsenic; chromium; copper; lead; manganese; and nickel. The 95% UCLs for benzo(a) anthracene, benzo(k)fluoranthene, phenanthrene, dieldrin, arsenic, chromium, copper, lead, manganese, and nickel detected at the background location was greater than or similar to concentrations detected in the Dennys River and Mill Pond sediments. Furthermore, the average and maximum PAH concentrations were detected at lower concentrations from the 1999 sampling round in comparison to the 1996/1997 sampling round. Given the magnitude by which the benchmarks were exceeded, the detection of several of the COCs detected at the background location, and the confirmation of lower PAH concentrations in sediments from the 1999 sampling round, it is unlikely that direct exposure of benthic organisms to the COCs detected in sediments from Meddybemps Lake, Dennys River and Mill Pond will result in adverse ecological effects.

Based on the most recent soil sampling results following the NTCRA, the 95% UCLs for arsenic, cadmium, chromium, and thallium exceeded ecological soil benchmarks. However, based on the limited number of soil samples collected, a 95% UCL could not be calculated for the majority of inorganic COCs. Pesticides, PCBs and PAHs were not detected in Site soils following the NTCRA. In addition, the average or 95% UCL background concentrations of aluminum, arsenic, barium, and chromium were similar to concentrations detected at the Site. Given the fact that the majority of the contaminated Site soils were excavated, it is unlikely that direct exposure to terrestrial invertebrates and plants to inorganics will result in an adverse ecological effect.

The ecological risk assessment is subject to some uncertainties. For example, in the

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exposure assessment, conservative assumptions were made in order to estimate daily intakes for the indicator species: the great blue heron, osprey and river otter. These species were assumed to spend 100% of foraging time within the Site. Since limited site-specific information was available, assumptions were made regarding ingestion rates, frequency of exposure, and exposure point locations. These conservative exposure point concentration and life-history exposure assumptions were made in the absence of site-specific information and most likely overestimate the risks to both avian and mammalian receptors. The reader is referred to Section 4.2.6.6 of the ERA (Weston, 1999) for a discussion of the primary uncertainties associated with the risk evaluation for each of the indicator species.

In summary, contaminant levels in surface waters, surface soils, sediments and fish and mussel tissues are not sufficiently elevated to pose a substantial risk to invertebrates, fish and wildlife through direct contact and dietary exposure to the site-related COCs.

3. Overall Risk Assessment Conclusion--Basis for Response Action

While the ecological risk assessment revealed that there is no substantial risk to ecological receptors due to site-related COCs, the baseline human health risk assessment revealed that future residents potentially exposed to COCs in groundwater via ingestion of drinking water may present an unacceptable human health risk. As such, actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

H. REMEDIATION OBJECTIVES

Based on preliminary information relating to types of contaminants, environmental media of concern, and potential exposure pathways, response action objectives (RAOs) were developed to aid in the development and screening of alternatives. These RAOs were developed to mitigate, restore and/or prevent existing and future potential threats to human health and the environment. The RAOs for the selected remedy for the Eastern Surplus Company Superfund Site are:

- S** Prevent the ingestion of groundwater contaminants that exceed federal or state maximum contaminant levels (MCLs), non-zero maximum contaminant level goals (MCLGs), State of Maine maximum exposure guidelines (MEGs), or in their absence, an excess cancer risk of 1×10^{-6} or a hazard quotient of 1 per contaminant;
- S** Prevent, to the extent practicable, the off-site migration of groundwater with contamination above cleanup levels;
- S** Restore groundwater to meet federal or state maximum contaminant levels (MCLs), non-zero

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maximum contaminant level goals (MCLGs), State of Maine maximum exposure guidelines (MEGs), or in their absence, an excess cancer risk of 1×10^{-6} or a hazard quotient of 1 per contaminant; and

- S** Provide long-term monitoring of surface water, sediments, groundwater, and fish to verify that the cleanup actions at the Site are protective of human health and the environment.

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I. DEVELOPMENT AND SCREENING OF ALTERNATIVES

1. Statutory Requirements/Response Objectives

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with all federal and more stringent state environmental and facility siting standards, requirements, criteria or limitations, unless a waiver is invoked; a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a preference for remedies in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances is a principal element over remedies not involving such treatment. Response alternatives were developed to be consistent with these Congressional mandates.

2. Technology and Alternative Development and Screening

CERCLA and the National Contingency Plan (NCP) set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements, a range of alternatives were developed for the Site.

With respect to the groundwater response action, the RI/FS developed a limited number of remedial alternatives that attain site-specific remediation levels within different time frames using different technologies, as well as a no-action alternative.

As discussed in Section 2 of the FS, groundwater treatment technology options were identified, assessed and screened based on implementability, effectiveness, and cost. Section 3 of the FS presented the remedial alternatives developed by combining the technologies identified in the previous screening process in the categories identified in Section 300.430(e)(3) of the NCP. The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was then evaluated in detail in Section 4 of the FS.

J. DESCRIPTION OF ALTERNATIVES

This Section provides a narrative summary of each management of migration alternative evaluated.

Management of migration (MM) alternatives address contaminants that have migrated into and with the groundwater from the original source of contamination. At the Site, contaminants have migrated

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from the surficial containers, leaking drums, and cans, and highly contaminated soils that were present at the Site prior to EPA's initial time-critical removal action and the NTCRA. The MM alternatives analyzed for the Site include:

- S** No Further Action
- S** Limited Action/Institutional Controls
- S** Groundwater Extraction With On-Site Treatment
- S** Groundwater Extraction With On-Site Treatment Along With Enhanced Flushing and/or Chemical Oxidation

Each of the four MM alternatives is summarized below. A more complete, detailed presentation of each alternative are found in Section 3 of the FS.

Alternative 1: No Further Action

No monitoring or other activities would take place beyond the NTCRA. The NTCRA source control groundwater system would be demobilized. Site use restrictions would be left to the local officials and/or State of Maine.

No costs are associated with this alternative.

Alternative 2: Limited Action/Institutional Controls

Long-term monitoring would be performed twice per year for 5 years and then annually for at least 30 years. The contamination is not expected to reduce to acceptable concentration for a period of approximately 150 years. Deed restrictions (e.g., easements and covenants) on the lands containing contaminated groundwater would be relied upon to prevent ingestion of contaminated groundwater.

Present Value: \$2,624,000

Alternative 3: Groundwater Extraction With On-Site Treatment

This alternative would use groundwater extraction and on-site treatment to restore the aquifer to drinking water standards. The time period for restoration of the aquifer was estimated to be between 30-60 years. At the end of the period, the groundwater beneath and adjacent to the Site is expected to meet federal and state drinking water standards. Two contaminant plumes exist at the Site and each would be aggressively remediated using a series of extraction wells. Approximately 3-5 bedrock wells would be used to extract the groundwater from each plume. Overburden wells may be included as part of the extraction system for the southern plume. The flow rate would be determined by the design. All

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of the groundwater withdrawn by the extraction wells would be sent to a common treatment plant for treatment. The system is expected to handle 10-20 gallons per minute of contaminated water. A series of carbon drums and filters would be used to reduce contaminants to federal and state drinking water standards prior to discharge into the overburden through an on-site infiltration gallery. PCE is expected to be the controlling constituent for the VOC treatment components and manganese for the inorganics.

Sampling of the monitoring wells, surface water, and nearby residents is expected to be performed twice per year for 5 years and then annually until cleanup is achieved. Costs were only estimated for 30 years of treatment system operation and monitoring.

Institutional controls in the form of deed restrictions, such as easements and covenants, would prevent groundwater use during the time period required for restoration of the groundwater. The State of Maine has agreed to impose institutional controls, in the form of restrictions or covenants that run with the land, on the two Site properties that it has agreed to accept ownership of. The ability of EPA or the State of Maine to secure deed restrictions on the property across Route 191, which contains the majority of the southern plume, however, may be difficult.

Capital Cost: \$830,610

Total Net Present Value: \$5,770,320 (assume 30 years at 7% discount rate)

Alternative 4: Groundwater Extraction With On-Site Treatment Along With Enhanced Flushing and/or Chemical Oxidation

This alternative would use groundwater extraction and on-site treatment to restore the aquifer to drinking water standards. It differs from Alternative 3 in that enhanced flushing and/or chemical oxidation of the aquifer will be used to reduce the time period required for restoration. It is assumed that these technologies will reduce the time period required for restoration to 5-10 years.

At the end of the period, the groundwater beneath and adjacent to the Site is expected to meet federal and state drinking water standards. Two contaminant plumes exist at the Site and each would be aggressively remediated using a series of extraction wells. Approximately 3-5 bedrock wells would be used to extract the groundwater from each plume. Overburden wells may be included as part of the extraction system for the southern plume. The flow rate would be determined by the design. All of the groundwater withdrawn by the extraction wells would be sent to a common treatment plant for treatment. The system is expected to handle 10-20 gallons per minute of contaminated water. A series of carbon drums and filters would be used to reduce contaminants to federal and state drinking water standards prior to discharge into the overburden through an on-site infiltration gallery. PCE is expected to be the controlling constituent for the VOC treatment components and manganese for the inorganics.

Sampling of the monitoring wells, surface water, and nearby residents is expected to be performed

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twice per year for 5 years and then annually until cleanup is achieved. Costs were only estimated for 5 years of treatment system operation and monitoring.

Institutional controls in the form of deed restrictions, such as easement and covenants, would prevent groundwater use during the time period required for restoration of the groundwater. The State of Maine has agreed to impose institutional controls, in the form of restrictions or covenants that run with the land, on the two Site properties that it has agreed to accept ownership of. The ability of EPA or the State of Maine to secure deed restrictions on the property across Route 191, which contains the majority of the southern plume, however, may be difficult.

Capital Cost: \$1,425,499

Total Net Present Value: \$4,108,679 (assume 30 years at 7% discount rate)

K. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 121(b)(1) of CERCLA presents several factors that at a minimum EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the NCP articulates nine evaluation criteria to be used in assessing the individual remedial alternatives.

A detailed analysis was performed on the alternatives using the nine evaluation criteria in order to select a site remedy. The following is a summary of the comparison of each alternative's strengths and weaknesses with respect to the nine evaluation criteria. These criteria are summarized as follows:

Threshold Criteria

The two threshold criteria described below must be met in order for the alternatives to be eligible for selection in accordance with the NCP:

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.
2. Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy will meet all Federal environmental and more stringent State environmental and facility siting standards, requirements, criteria or limitations, unless a waiver is invoked.

Primary Balancing Criteria

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The following five criteria are utilized to compare and evaluate the elements of one alternative to another that meet the threshold criteria:

3. Long-term effectiveness and permanence addresses the criteria that are utilized to assess alternatives for the long-term effectiveness and permanence they afford, along with the degree of certainty that they will prove successful.
4. Reduction of toxicity, mobility, or volume through treatment addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the Site.
5. Short term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.
6. Implementability addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
7. Cost includes estimated capital and Operation Maintenance (O&M) costs, as well as present-worth costs.

Modifying Criteria

The modifying criteria are used as the final evaluation of remedial alternatives, generally after EPA has received public comment on the RI/FS and Proposed Plan:

8. State acceptance addresses the State's position and key concerns related to the preferred alternative and other alternatives, and the State's comments on ARARs or the proposed use of waivers.
9. Community acceptance addresses the public's general response to the alternatives described in the Proposed Plan and RI/FS report.

Following the detailed analysis of each individual alternative, a comparative analysis, focusing on the relative performance of each alternative against the nine criteria, was conducted. A comparative analysis can be found as Table 4-5 of the FS.

Table 29 below presents the nine criteria and a brief narrative summary of the alternatives and the strengths and weaknesses according to the detailed and comparative analysis. Only those alternatives

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which satisfied the first two threshold criteria were balanced and modified using the remaining seven criteria.

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Table 29 - Summary for the Comparative Analysis of Alternatives

Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Of the alternatives evaluated, the No Further Action and Limited Action/Institutional Controls Alternatives would not be protective as they would allow for continued migration of contaminated groundwater. Alternatives 3 and 4 are protective of human health and the environment by eliminating, reducing, or controlling risks posed by the Site through extraction and treatment of contaminated groundwater as well as controlling the off-site migration of contaminated groundwater. Institutional controls would also be included to prevent exposure during the time period required for restoration of the groundwater. Alternatives 3 and 4 provide comparable protection with Alternative 4 being more protective as the time period for restoration is shorter.

Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address hazardous substances, the remedial action to be implemented at the Site, the location of the Site, or other circumstances present at the Site. Relevant and appropriate requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law which, while not applicable to the hazardous materials found at the Site, the remedial action itself, the Site location or other circumstances at the Site, nevertheless address problems or situations sufficiently similar to those encountered at the Site that their use is well-suited to the Site.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

All alternatives, except the No Further Action Alternative, had common ARARs associated with the drinking water standards for groundwater. All alternatives, except Alternatives 1 and 2, will attain their respective Federal and State ARARs. Drinking water standards may never be met through Alternatives 1 or 2, with at least 150 years estimated for natural attenuation. These standards may be met by the pump and treat alternatives in 30-60 years and within 5-10 years for pump and treat with enhanced flushing and/or chemical oxidation.

Because Alternatives 1 and 2 do not satisfy the first two threshold criteria, they were not analyzed using the seven remaining criteria.

Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been

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met. This criterion includes the consideration of residual risk and the adequacy and reliability of controls.

Alternative 3 provides a high degree of effectiveness and permanence with the removal of contaminants from the groundwater through treatment. Alternative 4 is more effective than Alternative 3 with the addition of enhanced flushing and/or chemical oxidation to more aggressively remove the contamination in the overburden and bedrock. Alternatives 3 and 4 are both effective and permanent in restoring groundwater quality by attaining drinking water standards in a reasonable time frame. Alternative 4 will achieve permanent restoration in the shortest time period.

Until the groundwater cleanup levels are achieved and the remedial action is determined to be protective by EPA, five-year reviews will be necessary to evaluate the effectiveness of any of these alternatives because hazardous substances would remain on-site in concentrations above health-based levels.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternatives 3 and 4 would provide comparable reductions in the mobility, volume, and toxicity of groundwater contamination at the Site. Volatile organic concentrations in groundwater would be reduced to drinking water standards through treatment of groundwater by carbon filters. The organics would eventually be destroyed by the carbon regeneration.

Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers and the community during construction and operation of the remedy until cleanup goals are achieved.

Alternatives 3 and 4 should be implemented within 1 year. The NTCRA has established much of the infrastructure needed to implement Alternatives 3 and 4. There would be the potential for limited exposure during installation of groundwater extraction wells and conveyance pipes. Implementation of Alternative 4 may involve increased construction risks due to the handling of chemical reagents.

Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

In general, Alternatives 3 and 4 can be easily implemented. All materials and services needed for implementation are readily, commercially available. The components necessary for the groundwater remedy are readily available and would not require any special engineering modification prior to use at the Site. Operation and maintenance of the carbon filters would include cleaning and replacement of well components, regeneration of activated carbon, and maintenance of the pumps. The institutional controls on the property across Route 191 from the "surficial" Site, however, may be difficult to implement.

Cost

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Alternative 3 is estimated to cost \$5.8 million, while Alternative 4 is estimated to cost \$4.1 million. In comparison with Alternative 3, Alternative 4 will require additional costs for the enhanced flushing and/or chemical oxidation. However, the predicted shorter timeframe to achieve the groundwater cleanup goals will result in reduced operation and maintenance costs. Accordingly, Alternative 4 is the more cost effective than Alternative 3.

State / Support Agency Acceptance

The State has expressed its support for Alternatives 3 and 4. The State does not believe that Alternatives 1 or 2 provide adequate protection of human health and the environment.

Community Acceptance

During the public comment period, the community expressed its support for either Alternatives 3 or 4. The community was highly supportive of the proposed action and wants EPA to take the most aggressive approach to Site restoration. The Passamaquoddy Tribe submitted comments in support of the Alternative 4. The Passamaquoddy Tribe also requested additional long-term monitoring.

L. THE SELECTED REMEDY

1. Summary of the Rationale for the Selected Remedy

The selected remedy is the final component of a comprehensive remedy for the Site which utilizes groundwater extraction with on-site treatment along with enhanced flushing and/or chemical oxidation. The selected remedy is the proposed preferred alternative that was identified in the Proposed Plan and that was presented in more detail in the FS.

2. Description of Remedial Components

The major components of the remedy are:

- S** Extraction and treatment of the contaminated groundwater in two distinct plumes (northern plume and southern plume) will be performed. Groundwater from each of the two contaminated plumes will be extracted and treated by a common treatment system. Each extraction system will be designed to prevent off-site migration of contaminated groundwater and restore the aquifer to drinking water standards;
- S** The groundwater extraction system will be enhanced by flushing of treated water and/or injection of a chemical reagent to facilitate the removal of contamination;
- S** Land-use restrictions in the form of deed restrictions, such as easements and covenants to

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prevent ingestion of groundwater and disturbance of archaeological resources, will be used to control the two parcels of property that represent the surficial extent of the Site, which the State of Maine has agreed to own. The State has agreed to impose institutional controls that run with the land for these parcels. Institutional controls shall also be implemented on those other Site properties upon which groundwater contamination is located until groundwater meets cleanup levels;

- S** Long-term monitoring of groundwater, surface water, and sediments will be performed to evaluate the success of the remedial action. Additional biota sampling (fish, mammals, and plants) may also be performed, as necessary;
- S** Portions of the mitigation of adverse effects upon the archaeological resources at the Site, caused by the non-time-critical removal action's soil excavation in 1999, will be performed as part of the remedial action; and
- S** Five-year reviews to assess protectiveness until cleanup goals have been met.

More specifically, the remedial action includes:

- a. Installation of groundwater extraction wells. The data generated by the NTCRA source control groundwater system will be evaluated to determine the need for additional data gathering prior to the design of the remedy. It is assumed that additional wells will be installed to provide a better assessment of the depth of contamination. The groundwater extraction wells will be installed in locations that will allow for the interception of the groundwater contamination before the contamination leaves the Site boundary. The extraction wells will also be located to maximize the withdrawal of contaminated water and restore the groundwater as soon as possible.
- b. Installation of a groundwater treatment system. The groundwater treatment system installed as part of the NTCRA will be operated and maintained to treat water collected by the extraction wells. Future expansion of the treatment system may be necessary to accommodate any additional extraction wells or to comply with discharge standards. The treated groundwater will be injected into an on-site infiltration gallery. The standards for reinjection of treated groundwater are the same as the groundwater cleanup standards for the Site.
- c. Operation, maintenance, and monitoring of the treatment system, along with long-term monitoring of the groundwater, surface water, and sediments. The system shall be operated and maintained to ensure the continuing effectiveness of the treatment system. Influent and

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effluent monitoring will be performed to evaluate the effectiveness of the treatment system. Water level monitoring will be used to evaluate the capture zone of the wells. Groundwater monitoring will indicate the effectiveness of the system in restoring the groundwater. Additional monitoring of surface water, sediments and fish may also be performed as determined necessary to evaluate the effectiveness of the selected remedy.

- d. Enhanced flushing and/or chemical oxidation of the aquifer to facilitate the removal of contamination from the bedrock and/or overburden. The major emphasis of the selected remedy is to use the best available techniques for reducing the time period required for restoration of the aquifer. This will achieve protection of human health more quickly and will also dramatically reduce the total cost of the remedy as the operation, maintenance, and monitoring over 60 years is substantial. The rate of injection of clean water and/or chemical reagent would be determined after pilots tests. The chemical reagent addition will need to be designed and implemented in a manner that does not allow for groundwater discharge to the Dennys River or Meddybemps Lake that would violate the State Water Quality Standards. In addition, any reagent addition would also need to be evaluated with respect to any potential impacts on the treatment plant.
- e. Institutional controls to prevent ingestion of groundwater during the period required for restoration and to protect archaeological resources. The State of Maine has agreed to implement institutional controls, such as restrictions and covenants that run with the land, on the Site properties that it has agreed to accept ownership of. Under the Consent Decree for the Site, the current property owners will transfer ownership of the two parcels of property that represent the surficial extent of the Site to the State of Maine. Institutional controls to prevent use of the contaminated groundwater will be implemented until the groundwater is restored to cleanup standards. Institutional controls with respect to the southern plume may be difficult to implement as the property upon which portions of the southern plume exist is owned by individuals, whom are not parties to the Consent Decree that obligates the other property owners to cooperate with EPA. In addition, institutional controls will be implemented on the portions of the Site containing archaeological resources (located in the northern portion of the Site) to prevent excavation or any other unauthorized disturbance of the archaeological resources.

In addition to federal and state drinking water standards that will define the discharge criteria and cleanup levels, the National Historic Preservation Act (NHPA) will impact the implementation of the selected remedy. One of the first actions to be undertaken as part of the selected remedy will be the continuation of the mitigation efforts required to offset adverse effects upon the archaeological resources at the Site caused by the NTCRA. The NTCRA resulted in unavoidable adverse effects because the excavation and off-site disposal of contaminated soils meant that

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certain archaeological resources were irretrievably lost. A Memorandum of Agreement with respect to the mitigation of adverse effects has been signed by EPA, the Maine Historic Preservation Commission, the Passamaquoddy Tribe, and the national Advisory Council on Historic Preservation, which memorialized the exact nature of the mitigation effort, as required by the NHPA. This effort includes additional archaeological field investigation extending over 200 square meters, reports addressing the scientific and cultural value of the recovered materials, and generation of popular reporting materials to transmit the findings to the public. The excavation portion of the mitigation requirements will be completed as part of the NTCRA. The long-term evaluation, documentation, and public outreach will be addressed as part of the Selected remedy.

After the cleanup levels have been met for three years and the remedy is determined to be protective, the groundwater treatment system will be shut down. The groundwater monitoring system will be utilized to collect information quarterly for three years to ensure that the cleanup levels have been met and the remedy is protective.

To the extent required by law, EPA will review the Site at least once every five years after the initiation of remedial action at the Site if any hazardous substances, pollutants or contaminants remain at the Site (until the groundwater cleanup goals are met) to assure that the remedial action continues to protect human health and the environment.

The selected remedy may change somewhat as a result of the remedial design and construction processes. Changes to the remedy described in this Record of Decision will be documented in a technical memorandum in the Administrative Record for the Site, an Explanation of Significant Differences or a Record of Decision Amendment, as appropriate.

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3. Summary of the Estimated Remedy Costs

Item	Description	Quantity	Unit	Cost
1.	Pre-Design Investigation			
	Drilling and installation of bedrock and overburden wells	8 bedrock 6 overburden	Lump sum (LS)	\$191,966
	Enhanced flushing and chemical oxidation pilot tests			\$180,000
	Field staff	6 persons	LS	\$72,615
2.	Design			
	Design Preparation			\$23,520
	Procurement			\$17,450
3.	Construction			
	Injection Wells	9	LS	\$94,832
	Mobilization/Demobilization		LS	\$39,770
	Trenching and Piping	1100 feet	LS	\$44,040
	Extraction Equipment		LS	\$113,511
	Electrical Equipment		LS	\$18,745
	Construction Oversight		LS	\$45,500
	Construction personnel and field equipment		LS	\$86,350
4.	Start-Up Testing		LS	\$43,400
	Sub-total			\$971,699
	Contractor mark-ups			\$308,000
	Contingency (15%)			\$145,800
	Capital Cost Total			\$1,425,499

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Year	Capital Cost	Annual Cost	Total Cost	Discount Factor	Present Worth
0	1,425,499	\$300,000	\$1,725,499	1	\$1,725,499
1		\$584,860	\$584,860	0.935	\$546,600
2		\$584,860	\$584,860	0.873	\$510,840
3		\$486,730	\$486,730	0.816	\$397,320
4		\$486,730	\$486,730	0.763	\$371,330
5		\$510,730	\$510,730	0.713	\$389,460
6-9		0	0	0	0
10		\$157,000	\$157,000	0.508	\$97,860
11-14		0	0	0	0
15		\$157,000	\$157,000	0.362	\$69,770
	Total Present Worth				\$4,108,679

Long-Term Monitoring	\$133,000 per event for 2 sampling events (groundwater, surface water, and sediments) for years 0-5, with 1 sampling event during years 10 and 15 \$24,000 additional in years 0, 5, 10, and 15 for sediment sampling
5-year reviews	\$35,500 per review
Operation and Maintenance of Pump and Treat System (included in these O&M costs are the costs for the injection of a chemical reagent)	\$318,000 for years 1 and 2 \$220,000 for years 3-5

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	All costs assume that the enhanced flushing and/or chemical oxidation will reduce the operating time of groundwater extraction and treatment system to 5 years. Costs for an additional five years of operation and maintenance are approximately \$700,000.
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The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an ESD, or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

4. Expected Outcomes of the Selected Remedy

The primary expected outcome of the selected remedy is that the entire Site will no longer present an unacceptable risk to future users of the groundwater via ingestion and inhalation of groundwater and will be suitable for unrestricted use. Approximately 5-10 years are estimated as the amount of time necessary to achieve the goals consistent with future residential land use. The selected remedy will also reduce the flux of VOCs into the Dennys River. The previous removal actions, including the NTCRA, have eliminated any threat from exposure to Site soils. It is anticipated that the selected remedy will also provide socio-economic and community revitalization impacts such as the Site potentially being used as a park or as a resource for future archaeological studies.

a. Cleanup Levels--Interim Groundwater Cleanup Levels

Interim cleanup levels have been established in groundwater for all chemicals of concern identified in the Baseline Risk Assessment found to pose an unacceptable risk to either public health or the environment. Interim cleanup levels have been set based on the ARARs (e.g., MCLs and more stringent State groundwater remediation standards) as available, or other suitable criteria described below. Periodic assessments of the protection afforded by remedial actions will be made as the remedy is being implemented and at the completion of the remedial action. At the time that Interim Groundwater Cleanup Levels identified in the ROD, ARARs, and newly promulgated ARARs and modified ARARs which call into question the protectiveness of the remedy have been achieved and have not been exceeded for a period of three consecutive years, a risk assessment shall be performed on all residual groundwater contamination to determine whether the remedial action is protective. This risk assessment of

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the residual groundwater contamination shall follow EPA procedures and will assess the cumulative carcinogenic and non-carcinogenic risks posed by all chemicals of concern (including but not limited to the chemicals of concern) via ingestion and dermal contact of groundwater and inhalation of VOCs from domestic water usage. If, after review of the risk assessment, the remedial action is not determined to be protective by EPA, the remedial action shall continue until either protective levels are achieved, and are not exceeded for a period of three consecutive years, or until the remedy is otherwise deemed protective or is modified. These protective residual levels shall constitute the final cleanup levels for this ROD and shall be considered performance standards for this remedial action.

Because the aquifer under the Site is a potential drinking water source, MCLs, non-zero MCLGs established under the Safe Drinking Water Act, and State of Maine maximum exposure guidelines (MEGs) are ARARs.

Interim cleanup levels for known, probable, and possible carcinogenic chemicals of concern (Classes A, B, and C) have been established to protect against potential carcinogenic effects and to conform with ARARs. Since MCLGs for Class A and B compounds are set at zero and are thus not suitable for use as interim cleanup levels, MCLs have been selected as the interim cleanup levels for these chemicals of concern. MCLGs for the Class C compounds are greater than zero, and can readily be confirmed; thus MCLGs have been selected as the interim cleanup levels for Class C chemicals of concern.

Interim cleanup levels for Class D and E chemicals of concern (not classified, and no evidence of carcinogenicity) have been established to protect against potential non-carcinogenic effects and to conform with ARARs. Because the MCLGs for these Classes are greater than zero and can readily be confirmed, MCLGs and proposed MCLGs have been selected as the interim cleanup levels for these classes of chemicals of concern.

Where a promulgated State standard is more stringent than values established under the Safe Drinking Water Act, the State standard was used as the interim cleanup level. In the absence of an MCLG, an MCL, a proposed MCLG, proposed MCL, a more stringent State standard, or other suitable criteria to be considered (e.g., health advisory, state guideline), an interim cleanup level was derived for each chemical of concern having carcinogenic potential (Classes A, B, and C compounds) based on a 10^{-6} excess cancer risk level per compound considering the current or future ingestion of groundwater from domestic water usage. In the absence of the above standards and criteria, interim cleanup levels for all other chemicals of concern (Classes D and E) were established based on a level that represent an acceptable exposure level to which the human population including sensitive subgroups may be exposed without adverse affect during a lifetime or part of a lifetime, incorporating an adequate margin of

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safety (hazard quotient = 1) considering the current or future ingestion of groundwater from domestic water usage.

Three constituents (arsenic, chromium, and cis 1,3 dichloropropene) were evaluated as contaminants of concern in the risk assessment were not retained as a final contaminants of concern and, therefore, cleanup levels were not established for these constituents. Arsenic and chromium were eliminated as site-specific contaminants of concern because the levels detected within the Site groundwater were below the federal MCLs. In addition arsenic and chromium were within the range found in local groundwater as background levels. Cis 1,3 dichloropropene was eliminated as a contaminant of concern because it was detected in only 1 of 36 samples and at a concentration that did not exceed the federal MCL.

Table 30 below summarizes the Interim Cleanup Levels for carcinogenic and non-carcinogenic chemicals of concern identified in groundwater.

Table 30 - Interim Groundwater Cleanup Levels						
Carcinogenic Chemicals of Concern	Cancer Classification	Interim Cleanup Level (ug/l)	Basis	RME Hazard Quotient	Target Endpoint	RME Risk
1,1,2 trichloroethane	C	3	MEG	0.02	Blood	2E-06
trichloroethene	B2	5	MCL	0.02	Cardiovascular/liver/CNS	6.4E-06
tetrachloroethene	B2	3	MEG	0.008	liver	1.8E-06
chloromethane	C	3	MEG	na	na	4.6E-07
methylene chloride	B2	5	MCL	0.002	liver	4.4E-07
polychlorinated biphenyls (PCBs)	B2	0.05	MEG	0.07	Skin/eye	1.1E-06
bis (2-ethyl hexyl)phthalate	C	6	MCL	0.008	liver	9.8E-07
Sum of Carcinogenic Risk						1.1E-05
Non-Carcinogenic Chemicals of Concern	Target Endpoint	Interim Cleanup Level (ug/l)	Basis			RME Hazard Quotient
cis-1,2 dichloroethene	liver	70	MCL/MCLG			0.19
manganese	central nervous system	200	MEG			0.17

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antimony	blood	6	MCL/MCLG			0.4
cadmium	kidney	5	MCL/MCLG			0.31
lead	central nervous system	15	Action Level			NA
xylene	central nervous system	600	MEG			0.008
1,1-dichloroethane	none observed	5	MEG			0.001
HI (liver): 0.23 HI (central nervous system): 0.2						
HI (blood): 0.42 HI (Kidney): 0.3 HI (skin/eye): 0.07						
<p>Key</p> <p>MCL: Federal Safe Drinking Water Act Maximum Contaminant Level MCLG: Federal Safe Drinking Water Act Maximum Contaminant Level Goal MEG: State of Maine Maximum Exposure Guidelines HI: Hazard Index RME: Reasonable Maximum Exposure</p>						

All Interim Groundwater Cleanup Levels identified in the ROD, ARARs, and newly promulgated ARARs and modified ARARs which call into question the protectiveness of the remedy and the protective levels determined as a consequence of the risk assessment of residual contamination, must be met at the completion of the remedial action at the points of compliance. At this Site, Interim Cleanup Levels must be met throughout the contaminated groundwater plume. The interim values represent concentration levels that cannot be exceeded in any given well location at the Site. EPA has estimated that the Interim Groundwater Cleanup levels will be obtained within 5-10 years after the initiation of the selected remedy.

M. STATUTORY DETERMINATIONS

The remedial action selected for implementation at the Eastern Surplus Company Superfund Site is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, will comply with ARARs and is cost effective. In addition, the selected remedy utilizes permanent solutions and alternate treatment technologies or resource recovery technologies to the maximum extent practicable, and satisfies the statutory preference for treatment that permanently and significantly reduces the mobility, toxicity or volume of hazardous substances as a principal element.

2. The Selected Remedy is Protective of Human Health and the Environment

The remedy at this Site will adequately protect human health and the environment by

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eliminating, reducing or controlling exposures to human and environmental receptors through treatment, engineering controls and institutional controls. More specifically, the selected remedy's (Alternative GW4) groundwater extraction system will also prevent the discharge of contaminated water into the Dennys River and Meddybemps Lake. Institutional controls will limit future Site use to prevent ingestion of groundwater during the period required for restoration. Long-term monitoring will allow for the evaluation of the cleanup and the identification of any future threats. The groundwater extraction and treatment system will prevent off-site migration of contamination and promote the restoration of the aquifer. As local residents are dependent upon groundwater for their water supply the containment of the plume and restoration of the groundwater are keys to protecting public health.

The selected remedy will reduce potential human health risk levels such that they do not exceed EPA's acceptable risk range of 10^{-4} to 10^{-6} for incremental carcinogenic risk and such that the non-carcinogenic hazard is below a level of concern. It will reduce potential human health risk levels to protective ARARs levels, *i.e.*, the remedy will comply with ARARs and To Be Considered criteria. Implementation of the selected remedy will not pose any unacceptable short-term risks or cause any cross-media impacts.

At the time that the ARAR-based Interim Groundwater Cleanup Levels identified in the ROD and newly promulgated ARARs and modified ARARs that call into question the protectiveness of the remedy have been achieved and have not been exceeded for a period of three consecutive years, a risk assessment shall be performed on the residual groundwater contamination to determine whether the remedy is protective. This risk assessment of the residual groundwater contamination shall follow EPA procedures and will assess the cumulative carcinogenic and non-carcinogenic risks posed by ingestion of groundwater and inhalation of VOCs from domestic water usage. If, after review of the risk assessment, the remedy is not determined to be protective by EPA, the remedial action shall continue until protective levels are achieved and have not been exceeded for a period of three consecutive years, or until the remedy is otherwise deemed protective. These protective residual levels shall constitute the final cleanup levels for this Record of Decision and shall be considered performance standards for any remedial action.

3. The Selected Remedy Complies With ARARs

The selected remedy will comply with all federal and any more stringent state ARARs that pertain to the Site. In particular, this remedy will comply with the following ARARs.

ARARs that define the cleanup levels that must be achieved by the selected action are:

Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), 40 CFR 141.11 -

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141.16. The SDWA MCLs and non-zero MCLGs are relevant and appropriate because they are the basis for some of the interim cleanup levels (*i.e.*, the Interim Groundwater Cleanup Levels) for the Site groundwater, which is a potential future drinking water source. MCLs were identified as a chemical specific standard in the FS. The Maine Department of Human Services Rule (10-144 CMR 231-233) standards are also chemical specific ARARs. The Maine primary drinking water standards are equivalent to MCLs. The selected remedy is expected to result in groundwater meeting the concentration requirements of the SDWA as specified as MCLs.

Maine Standards for Hazardous Waste Facilities, Miscellaneous Units (06-096 CMR Chapter 854, Section 15) Maximum Exposure Guidelines (MEGs). The Maine MEGs are the basis for some of the interim cleanup levels (*i.e.*, the Interim Groundwater Cleanup Levels) for the Site groundwater. MEGs were identified as an action specific standard in the FS. The Maine Standards for Hazardous Waste Facilities require that a miscellaneous unit must be closed in a manner that will ensure that hazardous waste shall not appear in ground or surface waters above MEGs. MEGs are relevant and appropriate because the Site is considered analogous to a miscellaneous hazardous waste unit. The selected remedy is expected to result in groundwater meeting the concentration requirements of the Maine MEGs.

In addition, Cancer Slope Factors (CSFs) and Reference Doses (RFDs) were included as criteria “to be considered” in establishing cleanup levels in the absence of a SWDA MCL or Maine MEG. CSFs and RFDs are guidance values used to evaluate the potential respective carcinogenic and non-carcinogenic hazard caused by exposure to Site contaminants. The recently issued Maine Department of Human Services, Maximum Exposure Guidelines for Drinking Water (MEGs), dated January 20, 2000 will be used as guidance for establishing cleanup levels when MCLs, non-zero MCLGs, and promulgated MEGs (1992) are not available.

ARARs that apply to the extraction, treatment, and reinjection of the contaminated groundwater are:

Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), 40 CFR 141.11 - 141.16. The SDWA MCLs and non-zero MCLGs are relevant and appropriate as reinjection criteria because they define levels that would be protective to a future user of the groundwater. MCLs were identified as a action specific standard in the FS with respect to the reinjection/recharge limits for the treatment plant. The Maine Department of Human Services Rule (10-144 CMR 231-233) standards are also action specific ARARs. The Maine primary drinking water standards are equivalent to MCLs. The selected remedy is expected to result in extracted groundwater being treated such that the effluent does not exceed MCLs prior to

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reinjection into the ground.

Underground Injection Control Regulations (40 CFR Parts 144, 145, 146, and 147). These regulations are relevant and appropriate because they provide regulatory compliance standards for treatment facilities that inject wastes underground. These regulations prohibit the use of wells to dispose of wastes. Treatment of the extracted groundwater to meet MCLs will result in the groundwater no longer being considered a hazardous waste; therefore, the selected remedy will comply with this requirement. In-Situ injection of reagents is not considered to be classified as disposal of a waste.

RCRA Air Emission Standards for Equipment Leaks (40 CFR 264 Subpart BB). This regulation contains air pollutant emission standards for equipment leaks at hazardous waste treatment, storage, and disposal facilities. The rule is applicable when the waste stream has an organic concentration of at least 10 percent by weight. As it is unlikely that the trigger concentration will be exceeded by the selected remedy as maximum concentrations, these regulations are considered relevant and appropriate for the selected remedy. A leak detection and repair program will be implemented during groundwater treatment to comply with these standards.

RCRA Containment Building Requirements (40 CFR 264 Subpart DD). This regulation is relevant and appropriate because it contains design, operation, closure, and post-closure standards and requirements for the storage and treatment of hazardous waste in containment buildings. The design, operation, closure, and post-closure of the selected remedy's groundwater treatment building will comply with requirements.

Clean Air Act - National Emissions Standards for Vinyl Chloride (40 CFR 61 Subpart F). These regulations are relevant and appropriate because vinyl chloride was detected at the Site. Any air emissions from the groundwater treatment will be monitored to comply with the requirements of these regulations.

Maine Standards for Hazardous Waste Facilities, Miscellaneous Units (06-096 CMR Chapter 854, Section 15) Maximum Exposure Guidelines (MEGs). MEGs were identified as an action specific standard in the FS. The Maine Standards for Hazardous Waste Facilities require that a miscellaneous unit must be closed in a manner that will ensure that hazardous waste shall not appear in ground or surface waters above MEGs. MEGs are relevant and appropriate because the Site is considered analogous to a miscellaneous hazardous waste unit. The selected remedy's treatment of extracted groundwater will result in effluent that does not exceed MEGs prior to reinjection into the ground.

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Maine Ambient Air Quality Standards (38 MRSA 584; 06-096 CMR Chapter 110). These regulations are relevant and appropriate because they establish ambient air quality standards for certain pollutants that have been detected at the Site. The emissions from the selected remedy will be monitored to ensure that the requirements in these regulations are met.

Maine Solid Waste Management Rules (06-096 CMR, Chapter 400.1). The regulations are applicable to the management of non-hazardous waste generated by the selected remedy. The spent carbon units may be managed under these requirements if they are determined to be non-hazardous.

Maine Air Pollution Control Laws - Maine Emissions License Regulations (38 MSRA 585, 590-591; 06-096 CMR Chapter 115). These regulations would be relevant and appropriate to the selected remedy if a technology employing air emissions is included in the treatment plant. At this time, no air emission technologies are planned for inclusion in the treatment plant.

Maine Rules to Control the Subsurface Discharge of Pollutants by Well Injection (06-096 CMR Chapter 543). These regulations are relevant and appropriate because they provide regulatory compliance standards for treatment facilities that inject wastes underground. The use of wells to dispose of wastes is prohibited. Treatment of the extracted groundwater to meet MCLs will result in the groundwater no longer being considered a hazardous waste; therefore, the selected action will comply with this requirement. In-Situ injection of reagents is not considered to be classified as the disposal of a waste.

Other criteria “to be considered” in the operation of the groundwater extraction and treatment system include:

Maine Department of Human Services, Interim Ambient Air Guidelines, Memorandum dated February 23, 1993. This memorandum provides a list of risk based criteria that apply to the ambient air as protective levels. The selected remedy is not expected to create an air emission release. Monitoring of the Site during the NTCRA has confirmed that there is not a concern regarding ambient air.

Maine Department of Human Services, Maximum Exposure Guidelines for Drinking Water (MEGs), Memorandum dated January 20, 2000. While not promulgated, these 2000 MEGs will be used to set treatment effluent levels when MCLs, non-zero MCLGs, and promulgated MEGs (1992) are not available.

ARARs that apply as a result of the location of the Site are:

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Protection of Wetlands (Executive Order 11990, 40 CFR 6.302(a) and 40 CFR 6, App. A (Policy on Implementing E.O. 11990)). Federal agencies are required to avoid undertaking or providing assistance for new construction located in wetlands unless there is no practicable alternative and the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use. There is a small wetland area in the northeast corner of the Site. There may be some unavoidable impacts to this wetland if monitoring wells or groundwater extraction wells must be located in this area to accomplish the remedial action. If any impacts occur, then all practical measures will be taken to minimize and mitigate any adverse effects.

Floodplain Management (Executive Order 11988, 40 CFR 6.302(b) and 40 CFR 6, App. A (Policy on Implementing E.O. 11988)). Federal agencies are required to avoid impacts associated with the occupancy and modification of a floodplain and avoid support of floodplain development wherever there is a practicable alternative. While there is no floodplain delineation for the area in which the Site is located, there may be limited activities associated with the installation of monitoring wells and sampling in the area that is seasonally flooded and is likely within the floodplain. The selected remedy will comply with these requirements by avoiding work in the potential floodplain to the extent practicable and minimizing the impacts to the function of the floodplain when impacts are unavoidable.

National Historic Preservation Act (16 USC 470 et seq; 40 CFR 800). These requirements are applicable because they contain provisions for the identification of and consideration of impacts on any historic properties prior to any federal undertaking. Previous work at the Site has identified historic properties (archaeological resources) that result in portions of the Site being deemed eligible for listing on the National Register of Historic Places. EPA has followed the NHPA Section 106 procedures for consultation with the Maine Historic Preservation Commission (the State Historic Preservation Officer), the national Advisory Council on Historic Preservation, the Passamaquoddy Tribe, and other consulting parties. Because adverse effects resulting from the implementation of the NTCRA on the Site's archaeological resources were unavoidable, steps have been and will be taken to minimize and mitigate the adverse effects in accordance with the NHPA. An agreement regarding the scope of mitigation activities has been reached, and a Memorandum of Agreement has been executed to memorialize such agreement. The excavation portion of the mitigation requirements will be completed as part of the NTCRA. The long-term evaluation, documentation, and public outreach will be addressed as part of the selected remedy.

Endangered Species Act (16 USC 1531 et seq.; 40 CFR 6.302 (h)). This statute requires that federal agencies avoid activities that jeopardize threatened or endangered species or adversely modify habitats essential to their survival. One threatened species, the American Bald Eagle, inhabits the area in which the Site is located. No endangered or threatened species were

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identified on-site. In addition, the selected remedy is not anticipated to jeopardize or have an adverse effect on the American Bald Eagle or any other threatened or endangered species. Rather, the selected remedy combined with the NTCRA will reduce the levels of contamination in the habitat of the American Bald Eagle and the Atlantic Salmon (if listed).

Maine Wetlands Protection Rule (06-096 CMR Chapter 310, Section 1). This rule is applicable because activities adjacent to a freshwater wetland greater than 10 acres or with an associated stream, brook, or pond must not unreasonably interfere with certain natural features, such as natural flow, quality of waters, nor harm significant aquatic habitat, freshwater fisheries, or other aquatic life. The selected remedy will comply with this requirement through minimization of any impacts along the shoreline and river bank along with erosion and sediment control practices during any necessary activities within 100 feet of the surface water or wetland.

Maine Natural Resources Protection Act, Permit by Rule Standards (06-096 CMR Chapter 305). The rule is applicable because it prescribes standards for specific activities that may take place in or adjacent to wetlands or water bodies. The standards are designed to ensure that the disturbed soil material is stabilized to prevent erosion and siltation of the water. There will be minimal activities during the remedial action that cause a substantial disturbance of the soil. Erosion control and sediment control measures will be put in place to meet the requirements of this rule.

Maine Endangered Species Act and Regulations (12 MSRA Section 7751-7756; 09-137 CMR 008). The State of Maine determines the appropriate uses of habitat for species on the Maine Watch List, Special Concern List, and Indeterminate Category. A freshwater mussel, the brook floater, occurs in the vicinity of the Site and is a Special Concern species in Maine. The selected remedy is not expected to have an impact on this species. The injection of the chemical reagents into the groundwater will be under a controlled situation that will minimize the potential for discharge of any chemicals into the surface water. This regulation would only be applicable if such species are encountered.

Maine Site Location Law and Regulations (38 MRSA Sections 481-490; 06-096 CMR Chapter 375). These regulations are relevant and appropriate because they prescribe standards for specific activities that are considered to be a development. The selected remedy will comply with these standards by preventing unreasonable adverse effects to: air quality; runoff/infiltration relationships and surface water quality; and alteration of climate or natural drainage-ways as well as implementing erosion, sediment, and noise controls.

A discussion of why these requirements are applicable or relevant and appropriate may be found in the FS Report in Section 2.

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4. The Selected Remedy is Cost-Effective

In EPA's judgment, the selected remedy is cost-effective because the remedy's costs are proportional to its overall effectiveness (see 40 CFR 300.430(f)(1)(ii)(D)). This determination was made by evaluating the overall effectiveness of those alternatives that satisfied the threshold criteria (i.e., that are protective of human health and the environment and comply with all federal and any more stringent State ARARs, or as appropriate, waive ARARs). Overall effectiveness was evaluated by assessing three of the five balancing criteria -- long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness, in combination. The overall effectiveness of each alternative then was compared to the alternative's costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence represents a reasonable value for the money to be spent. As only two alternatives were considered to be protective and ARAR compliant, the evaluation of the most cost effective alternative was based upon a comparison of the costs between Alternative 3 (with a net present value of \$5.8 million) and Alternative 4 (with a net present value of \$4.1 million). The only substantive differences between the two are Alternative 4's cost for the chemical reagent addition and the reduced time period for operation, maintenance, and monitoring (and the resulting reduction in long-term operation and maintenance costs). The selected remedy (Alternative 4) will attain cleanup goals in 5-10 years as opposed to the 30-60 years estimated for Alternative 3. Therefore, Alternative 4 is the most cost effective of the alternatives evaluated.

4. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

Once EPA identified those alternatives that attain or, as appropriate, waive ARARs and that are protective of human health and the environment, EPA then identified which alternative utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination was made by deciding which one of the identified alternatives provides the best balance of trade-offs among alternatives in terms of: 1) long-term effectiveness and permanence; 2) reduction of toxicity, mobility or volume through treatment; 3) short-term effectiveness; 4) implementability; and 5) cost. The balancing test emphasized long-term effectiveness and permanence and the reduction of toxicity, mobility and volume through treatment; and considered the preference for treatment as a principal element, the bias against off-site land disposal of untreated waste, and community and state acceptance. The selected remedy provides the best balance of trade-offs among the alternatives.

Only two alternatives were considered to be protective and able to fully comply with ARARs.

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Alternative 1 (No Further Action) was not considered to be protective or compliant with ARARs. Alternative 2 (Limited Action/Institutional Controls) would be more protective; however, compliance with groundwater cleanup ARARs is uncertain. Of the four alternatives evaluated, only two alternatives, Alternative 3 (Groundwater Extraction With On-Site Treatment) and Alternative 4 (Groundwater Extraction with On-Site Treatment Along With Enhanced Flushing and/or Chemical Oxidation), are protective and fully compliant with ARARs. Both Alternatives 3 and 4 achieve similar degrees of long-term effectiveness and permanence while using treatment to reduce the toxicity, mobility, or volume. Treatment is a principle element of both Alternative 3 and Alternative 4. The State of Maine and the community were very supportive of both Alternative 3 and Alternative 4. However, the potential to achieve cleanup goals in a shorter timeframe and at a lower cost supports the selection of Alternative 4 over Alternative 3.

5. The Selected Remedy Satisfies the Preference for Treatment Which Permanently and Significantly Reduces the Toxicity, Mobility or Volume of the Hazardous Substances as a Principal Element

The principal element of the selected remedy is the extraction and treatment of contaminated groundwater. This element addresses the primary threat at the Site, contamination of groundwater, as defined by the risk to local water supplies and the exceedance of MCLs. The selected remedy satisfies the statutory preference for treatment as a principal element by reducing the contamination in the aquifer through extraction and treatment of the contaminated groundwater.

6. Five-Year Reviews of the Selected Remedy are Required

Because this remedy will result in hazardous substances remaining on-site above levels that will not allow for unlimited use and unrestricted exposure, a review will be conducted within five years after initiation of the remedial action, until the groundwater cleanup goals are met, to ensure that the remedy continues to provide adequate protection of human health and the environment.

N. DOCUMENTATION OF NO SIGNIFICANT CHANGES

EPA presented a proposed plan that described extraction and treatment of the groundwater along with the possibly use of enhanced flushing and/or chemical oxidation as the proposed long-term remediation of the Site on August 19, 1999. EPA reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the proposed plan, were necessary.

One cleanup standard has been modified since the Proposed Plan. The cleanup standard for PCBs has been revised to 0.05 ug/l to reflect the State of Maine MEG as opposed to the federal MCL. This

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change results in the cleanup being more protective. As MCLs and MEGs were identified as the basis for cleanup levels in the FS and Proposed Plan, this change is not considered significant.

O. STATE ROLE

The State of Maine Department of Environmental Protection has reviewed the various alternatives and has indicated its support for the selected remedy. The State has also reviewed the Remedial Investigation, Risk Assessment and Feasibility Study to determine if the selected remedy is in compliance with applicable or relevant and appropriate State environmental and facility siting laws and regulations. The State of Maine concurs with the selected remedy for the Eastern Surplus Company Superfund Site. A copy of the declaration of concurrence is attached as Appendix B.

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RECORD OF DECISION RESPONSIVENESS SUMMARY

A. PREFACE:

In August 1999, the U.S. EPA presented a Proposed Plan for the long-term cleanup of the Eastern Surplus Company Superfund Site in Meddybemps, Maine. The Proposed Plan was based upon the remedial investigation and feasibility study (RI/FS) for the Site. All documents which were relied upon in the selection of the cleanup action presented in the Proposed Plan were placed in the Administrative Record, which is available for public review at the EPA Records Center at 1 Congress Street in Boston, Massachusetts and the Calais Public Library on Union Street in Calais, Maine.

A 30-day comment period was held from August 20, 1999 to September 20, 1999. A public hearing was held on September 8, 1999. Based upon a request from the Passamaquoddy Tribe, EPA extended the comment period for an additional 90 days. The comment period for the Proposed Plan ended on December 20, 1999.

The purpose of this Responsiveness Summary is to document EPA's responses to the questions and comments raised during the public comment period. EPA considered all of the comments summarized in this document before selecting a final remedial alternative to address contamination at the Site.

This Responsiveness Summary is organized into the following sections:

- B. Overview of the Remedial Alternatives Considered in the FS and Proposed Plan, Including the Preferred Alternative - This section briefly outlines the remedial alternatives evaluated in the FS and the Proposed Plan, including EPA's preferred alternative.
- C. Site History and Background on Community Involvement and Concerns - This section provides a brief history of the Site and an overview of community interests and concerns regarding the Site.
- D. Summary of Comments Received During the Public Comment Period - This section summarizes, and provides EPA's response to, the oral and written comments received from the public during the comment period. Part A presents the comments received from citizens and local officials; Part B presents comments received from the Passamaquoddy Tribe; and Part C presents comments received from the Maine Department of Environmental Protection.
- E. The Selected Remedy's Changes to the Proposed Remedy Made Based Upon Public Comments - This section summarizes any changes that were made to the preferred alternative presented in the Proposed Plan based upon EPA's consideration of the comments received

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during the public comment period.

In addition, two attachments are included with this Responsiveness Summary. Attachment A lists community participation activities concerning this Site conducted by EPA and ME DEP. Attachment B contains a copy of the transcript from the public hearing held on Wednesday, September 8, 1999 in Meddybemps, Maine. All of the original comments submitted by citizens and the State of Maine are included in the Administrative Record.

B. OVERVIEW OF THE REMEDIAL ALTERNATIVES CONSIDERED IN THE FS AND PROPOSED PLAN, INCLUDING THE PREFERRED ALTERNATIVE

Using the information gathered during the RI, including the human health and ecological risk assessments, EPA identified several cleanup objectives for the Eastern Surplus Company Site. The development and evaluation of cleanup options was greatly influenced by the selection and implementation of a non-time critical removal action (NTCRA) at the Site. The NTCRA involved the excavation and off-site disposal of contaminated soils. The NTCRA also included a source control groundwater extraction system. All of the soils above cleanup levels for PCBs, metals, and VOCs were removed from the Site by November 1999. The remaining soils are not considered to be a source of contamination. The northern plume groundwater extraction system was installed in 1999 and operation began in February 2000. The southern plume extraction system began operation in September 2000.

The Remedial Action Objectives were developed based upon the results of the human health and ecological risk assessments. Future ingestion of groundwater was identified as the only medium of significant concern. Long-term evaluation of the sediments was also identified as a concern to assure that conditions in the Dennys River do not deteriorate. The Remedial Action Objectives for the Site are:

- S** Prevent the ingestion of groundwater containing contaminants that exceed federal or state maximum contaminant levels (MCLs), non-zero maximum contaminant level goals (MCLGs), State of Maine maximum enforcement guidelines (MEGs), or in their absence, an excess cancer risk of 1×10^{-6} or a hazard quotient of 1;
- S** Prevent, to the extent practicable, the off-site migration of groundwater with contamination above cleanup levels;
- S** Restore groundwater to meet federal or state maximum contaminant levels (MCLs), non-zero maximum contaminant level goals (MCLGs), State of Maine maximum enforcement guidelines (MEGs), or in their absence, an excess cancer risk of 1×10^{-6} or a hazard quotient of 1; and

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- S** Provide long-term monitoring of surface water, sediments, groundwater, and fish to verify that the cleanup actions at the Site are protective of human health and the environment.

After identifying the cleanup objectives, EPA developed and evaluated potential cleanup alternatives to address site contamination. The FS describes the cleanup alternatives and criteria EPA used to determine the alternatives retained for detailed analysis.

EPA's Proposed Plan's preferred alternative, Alternative 4, includes the following features:

- S** Extraction and treatment of the contaminated groundwater in two distinct plumes (northern plume and southern plume) will be performed. Groundwater from each of the two contaminated plumes will be extracted and treated by a common treatment system. Each extraction system will be designed to prevent off-site migration of contaminated groundwater and restore the aquifer to drinking water standards;
- S** The groundwater extraction system may be enhanced by flushing of treated water and/or injection of a chemical reagent to facilitate the removal of contamination;
- S** Land-use restrictions in the form of deed restrictions, such as easements and covenants to prevent ingestion of groundwater and disturbance of archaeological resources, will be used to control the two Site parcels agreed to be owned by the State of Maine. The State has agreed to impose institutional controls that run with the land for these parcels. Institutional controls shall also be implemented on those other Site properties upon which groundwater contamination is located until groundwater meets cleanup levels;
- S** Long-term monitoring of groundwater, surface water, and sediments will be performed to evaluate the success of the remedial action. Additional biota sampling (fish, mammals, and plants) may also be performed, as necessary;
- S** Portions of the mitigation of adverse effects upon the archaeological resources at the Site, caused by the non-time-critical removal action's soil excavation in 1999, will be performed as part of the remedial action; and
- S** Five-year reviews will be performed to assess protectiveness until cleanup goals have been met.

In the Feasibility Study Report, the estimated net present worth of the proposed remedy is \$4.1 million dollars. The Proposed Plan's preferred alternative was chosen as the selected remedy because, of all

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the alternatives, it achieved the best balance of the criteria which EPA is required by law to evaluate. The selected remedy provides an effective reduction in human health risk, will attain federal and state cleanup standards, reduces the toxicity and volume of contaminated groundwater, and utilizes permanent solutions to the maximum extent practicable. The following alternatives, including the selected remedy (Alternative 4), were evaluated in the FS.

Alternative 1--No Further Action: Under this alternative, no action beyond the NTCRA would be implemented at the Site. The groundwater extraction systems would be shut down and no further monitoring would be performed.

Alternative 2--Limited Action/Institutional Controls: Under this alternative, institutional controls and monitoring would be the mechanism to prevent exposure to contaminated groundwater.

Alternative 3--Groundwater Extraction With On-Site Treatment: Under this alternative, the institutional controls and monitoring of Alternative 2 would be implemented. In addition, a groundwater extraction system would be implemented to restore the groundwater to cleanup levels and prevent the off-site migration of groundwater. The groundwater extraction system would be an expansion of the system installed as part of the NTCRA.

Alternative 4--Groundwater Extraction With On-Site Treatment Along With Enhanced Flushing and/or Chemical Oxidation: This is the preferred alternative. This alternative is the same as Alternative 3 with the addition of flushing and/or chemical oxidation to reduce the time necessary to achieve cleanup levels.

C. SITE HISTORY AND BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The Site was historically used as farm land and was the location of a mill. In 1946, a portion of the Site was acquired by Mr. Harry Smith, Sr. (now deceased). The present owner of this portion of the Site is Harry J. Smith, Jr. The two Smiths owned and operated a business known as the Eastern Surplus Company, which stored and resold, among other things, supplies, materials and equipment acquired from the U.S. Department of Defense (DOD). The Eastern Surplus Company used the Site as a salvage/storage yard to store these items. Mr. Smith, Sr. also installed and used a hydroelectric station to generate power until 1966. Most business and storage activities ceased at the Site between 1973 and 1976. By the 1970's, thousands of compressed gas cylinders, drums, small containers, and other materials were present at the Site.

In 1985, the Maine Department of Environmental Protection (ME DEP) performed an inspection of the Site and identified the Site as an uncontrolled hazardous substance site in need of response. The ME

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DEP initiated a removal action to stabilize the Site. The ME DEP removed approximately 120 transformers and fenced the Site. The Maine State Police also swept the Site for munitions.

In 1986, EPA took over the removal action initiated by the ME DEP. The removal involved the inspection, evaluation, sampling (if necessary), and disposal (if necessary) of: 312 fifty-five gallon drums; 24 thirty gallon cans; 1,226 five gallons cans; 168 one hundred pound containers of calcium carbide; 1,182 miscellaneous small containers; 10 cubic yards of asbestos; and 2,674 compressed gas cylinders. EPA removed thousands of leaking drums and cans from the Site. EPA also provided oversight of DOD's removal of several thousand compressed gas cylinders. The EPA time-critical removal action was completed in 1990. The removal was successful at removing the hazardous substances above the ground surface.

The Site was proposed for inclusion on the National Priorities List (NPL) on October 2, 1995 (60 Fed. Reg. 51390). The Site was listed for final inclusion on the NPL on June 17, 1996 (61 Fed. Reg. 30510). In accordance with statutory requirements for NPL sites, the Agency for Toxic Substances and Disease Registry (ATSDR) completed a Preliminary Health Assessment for the Site. The ATSDR report recommended that further studies be performed to identify potential public health threats.

In 1996, EPA began the remedial investigation and feasibility study (RI/FS) for the Site. Initial studies revealed two areas of highly contaminated soil and groundwater. These areas were the subject of a non-time-critical removal action (NTCRA) which began in 1998. EPA completed the comprehensive study of the Site in 1999. The RI/FS confirmed the contamination in the soil and groundwater that was the basis for the NTCRA. The RI/FS also documented that there are low levels of PCBs in the Dennys River and the fish found in the Dennys River..

1. History of Community Involvement

The Site is situated in a small Town in rural Washington County, Maine. The local residents are quite interested in events in their community and have actively followed the Site. The summer residents of Meddybemps Lake also have substantial interest in any activity that may impact the quality of the Lake. EPA has attended the annual Meddybemps Lake Association meeting to provide an update of Site activities. EPA also was able to develop a strong sense of community concerns during visits to residences during the sampling of all residential wells within 1 mile of the Site (30 wells in all).

2. Public Reaction to the EPA's Preferred Alternative

The community has been strongly supportive of the EPA cleanup activities at the Site from the start. The community views the preferred alternative as the next logical step in the cleanup process. Some members of the community have expressed the desire to have the Site land made accessible to the local

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community. This will be an issue for the State of Maine as the State will own the two parcels of property that represent the surficial extent of the Site.

The Passamaquoddy Tribe submitted a set of comments that identified concerns regarding the adequacy of the RI/FS to address exposure to contamination based upon historic uses of the area by the Passamaquoddy.

D. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSE

This Responsiveness Summary addresses comments pertaining to the Proposed Plan and FS which were received by EPA during the extended comment period from August 19, 1999 to December 20, 1999. Several individuals, the Passamaquoddy Tribe, and the State of Maine submitted comments to EPA either in writing or at the public hearing. None of the comments received were in opposition to the proposed cleanup action.

PART 1. SUMMARY OF COMMENTS FROM CITIZENS AND LOCAL OFFICIALS

All of the local citizens and local officials comments were in support of the selected remedy.

Response: EPA wishes to thank the community and local officials for their continued support for the cleanup of the Site.

PART 2. SUMMARY OF PASSAMAQUODDY TRIBE COMMENTS

Comment 1: The ERA does not mention the inclusion of the Passamaquoddy as participating in the ERA. The Passamaquoddy have a vested interest in the ecological resources of the site and because they were not included, culturally important species were not included in the ERA, including bear, moose, game birds, and muskrat, which are hunted for food.

Response: The purpose of the Ecological Risk Assessment (ERA) is to identify site-related impacts to non-human receptors. The ERA for the Site did address food chain impacts to predators and evaluated the potential Site impacts to birds, fish, and mammals. The Human Health Risk Assessment (HHRA) is the relevant document for the assessment of food chain impacts on human receptors. EPA believes that the HHRA is an accurate assessment of the potential threats to human health with respect to current and reasonable expected future uses of the area near the Site. Please note that the majority of the contamination in the Dennys River is located within a few hundred yards of the Route 191 bridge in Meddybemps. The concentrations of PCBs drops to very low levels (a few parts per billion) within the first 0.5 mile below the Route 191 bridge.

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EPA has offered to meet with the Passamaquoddy Tribe to review the exposure assumptions in the HHRA. If there are pathways associated with Site conditions that have not been adequately addressed and which pose potential public health concerns, then EPA will collect additional data as part of the long-term monitoring program and will perform a revised risk evaluation of the data.

Comment 2: Ecologically important and culturally significant terrestrial and aquatic vascular plants were not included in the ERA. This area has been used traditionally to gather food and “medicine” plants which are used by Tribal members. The Passamaquoddy formally requests additional study and adjustments to the scope of the ERA be made, with Passamaquoddy participation, including considerations for additional study such as sampling, monitoring, and modeling, so that the ERA becomes appropriate and relevant to our concerns and needs as Native people. The Tribe also requests that clear risk statements be published for the consumption of game birds, animals and medicine plants.

Response: As mentioned above, the ERA is a document that is focused on non-human receptors. In the HHRA, EPA evaluated the consumption of fish by a recreational fisherman. This was consistent with EPA discussions with the local residents of the area and from discussions with the Passamaquoddy. It is unlikely that the Site contamination has a substantial impact on game birds, animals, and medicine plants given the relatively low levels of contamination in the sediments. The on-site soils that were highly contaminated were not vegetated and the debris cover would have significantly limited animal and game bird exposure.

As stated in response to Comment 1, EPA has offered to meet with the Passamaquoddy Tribe to review the Site and identify areas that may require additional sampling. EPA has been providing all of the Site data to the Maine Bureau of Health as well as the Agency for Toxic Substance and Disease Registry. EPA will work with these entities along with the Passamaquoddy Tribe to develop a fact sheet to describe any potential public health concerns that may be identified as a result of any additional sampling and risk evaluation.

Comment 3: The Tribe is concerned with the overall impact that may exist to the ecosystem as a whole from the bioaccumulative substances such as PCBs in the sediments and the long-term health risks associated with the sediments. There was no formal analysis of important stressors such as habitat alteration or loss that affect organisms at various levels. There was no analysis of population level effects or interactions between species. This oversight seems especially significant when the restoration of the culturally important Atlantic salmon is considered. The Passamaquoddy Tribe hereby requests training and involvement in the long-term monitoring program for surface water, groundwater, and sediments.

Response: The ERA prepared for the Site did assess the potential impact to the ecosystem from the

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contamination at the Site. The HHRA evaluated the potential long-term human health risks. The majority of the ERA and HHRA assessments were focused on PCBs. All relevant stressors were evaluated as part of the ERA process. Habitat alteration with respect to the contamination and the remediation of the Site was not specifically addressed; however, it should be noted that the Site is relatively small and that the past activities at the Site have not significantly impacted the downstream habitat.

It is unclear what level of evaluation the Passamaquoddy Tribe is requesting with respect to this issue. As stated in the response to the previous comments, EPA is committed to working with the Passamaquoddy as part of the long-term monitoring program. Future data gathering efforts can be used to address any relevant concerns that have not been addressed by the ERA or HHRA. With respect to training, EPA has provided a Superfund Core Cooperative Agreement Grant to the Passamaquoddy as a mechanism to fund training in environmental work. In addition, EPA has provided on-Site training to members of the Passamaquoddy Tribe with respect to achieving OSHA certification. EPA continues to be willing to coordinate with the Passamaquoddy to provide opportunities to observe the activities at the Site.

EPA does not provide Site-specific funding for training as part of the Superfund activities. Funding for training is best obtained under the type of arrangement currently in place (Cooperative Agreement).

Comment 4: The Passamaquoddy was not appropriately notified regarding the court decree deciding the future ownership of the site and naming the PRPs. Since a major archaeological site was discovered on this land, the timing of the Tribe's involvement and ability to comment on the court decree has negatively affected Passamaquoddy involvement in the future of the artifacts and the future use of this culturally important site. The Passamaquoddy Tribe demands that EPA act on its trust responsibility to have the Decree modified to deal with the artifacts directly.

Response: EPA made every effort to ensure that all local affected parties were made aware of the consent decree. Notice of the 30-day comment period for the proposed consent decree was announced in a February public relations fact sheet that was sent to the Site mailing list, including the Passamaquoddy tribal offices in Indian Township and Pleasant Point. The proposed consent decree was the subject of several articles in local newspapers (Bangor Daily News, Quoddy Times). EPA also formally announced the availability of the consent decree for review in the Federal Register. In addition, EPA met with the Governors of Indian Township and Pleasant Point on May 21, 1998 to provide an update of Site activities, including the negotiations with the PRPs.

On May 13, 1998, EPA sent a letter to Trevor White, the Environmental Planner for Indian Township, requesting the identification of any trustee issues with respect to the Site. A copy of this letter was also

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sent to Jeff Loman of the U.S. Bureau of Indian Affairs. EPA also notified the Department of Interior, as Natural Resource Trustee, of the negotiations with the PRPs.

The discovery of artifacts at the Site was made in April 1999, whereas the consent decree was finalized in March 1999. Therefore, the presence of the artifacts was not known to the parties prior to the finalization of the consent decree. Upon discovery of the artifacts, EPA quickly notified the Passamaquoddy Tribe and subsequently provided substantial involvement for the Passamaquoddy during the implementation of the soil cleanup.

The consent decree is a legal document which pertains to the liability of three groups of PRPs (Harry J. Smith, Jr.; Terrell & Lisa Lord; and federal agencies, the Department of Defense and the General Services Administration). EPA and the State of Maine entered into the consent decree to recovery necessary and reasonable response costs that had been or were to be incurred at the Site. As the property owner PRPs were unable to make a cash contribution to the settlement, their properties were the only assets of value that were available as consideration for the settlement. The transfer of the land into the hands of the State of Maine will prevent future re-contamination of the Site. It is not the intent of the consent decree to address the artifacts or any of the issues pertaining to the National Historic Preservation Act.

With respect to the archaeological artifacts, in July 2000, EPA, the Maine Historic Preservation Commission, the national Advisory Council on Historic Preservation, and the Passamaquoddy Tribe signed a memorandum of agreement that included provisions for archaeological excavations, scientific interpretation, public viewing, and cultural interpretation of the artifacts. A separate agreement was reached to provide for custody of the artifacts by the Abbe Museum on behalf of the Passamaquoddy Tribe.

Comment 5: At this writing, the Tribe has not seen the collection of artifacts dug from the Eastern Surplus Co. site. Under the Native American Graves Protection and Repatriation Act, the Passamaquoddy Tribe has the right to obtain repatriation of cultural items which includes "associated funerary objects, unassociated funerary objects, sacred objects and objects of cultural patrimony." The Tribe demands that the EPA not go forward with deeding the property to the State of Maine until the artifacts issues are resolved.

Response: With respect to the Tribe seeing the artifacts, since the submission of this comment, on May 19, 2000, EPA presented the artifacts found up to that date to the Passamaquoddy Tribe for viewing and initial discussion. As part of the mitigation activities described in the MOA, EPA will continue to periodically make presentations concerning the artifacts to the public, including the Passamaquoddy Tribe.

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While it is true that NAGPRA provides for the repatriation, disposition, and protection of Native American human remains and other defined cultural items, NAGPRA only applies to federal lands, those lands owned or controlled by the United States, and to tribal lands. 25 U.S.C. § 3001 et seq. At the Site, the artifacts have been found on properties owned by Harry J. Smith, Jr. and Terrell & Lisa Lord, who have agreed to transfer the Site properties to the State of Maine pursuant to a Consent Decree resolving claims under CERCLA and the Maine Uncontrolled Hazardous Substance Site Law. Further, the ongoing examination of the artifacts suggests that they do not meet the criteria provided by NAGPRA. Therefore, given the nature of the artifacts recovered to date, and because EPA does not own or control the Site properties, NAGPRA does not apply to this Site.

EPA cannot hold up the transfer of the properties at the Site for an indefinite period of time. The consent decree requires that the Lords' property be transferred to the State of Maine within two years after the entry of the consent decree as final judgment. Almost one year has past since the consent decree's entry. With respect to the Smith property, while there is no final date established for the land transfer, given the extent of the liens on the property, the parties contemplated the transfer of this property as soon as the liens are cleared. For both Site properties, EPA is interested in having them transferred as soon as possible in order that the consent decree obligations will be met expeditiously. Further, as discussed above in the response to comment #4, the artifacts issues have been resolved.

Comment 6: Under the National Historic Preservation Act (NHPA) and the Archaeological Resources Protection Act (ARPA) Indian tribal governments possess inherent sovereign authority over the subject matter of cultural resources management. 36 CFR Part 800: Protection of Historic Properties, provides guidance for adverse effects to historic properties. Many artifacts were lost with soil excavation due to the high levels of contamination. The Passamaquoddy Tribe formally requests that a MOA be signed between the EPA and the Passamaquoddy Tribe outlining future archaeological plans, future land use restrictions on the site and an agreement for repatriation if such objects are found. The Tribe also respectfully requests that funds be made available to the Tribe for education, interpretation and display of artifacts.

Response: As discussed in the response to comment #4, a Memorandum of Agreement (MOA) has been signed by EPA, the Passamaquoddy Tribe, the Maine Historic Preservation Commission, and the national Advisory Council on Historic Preservation that addresses all of the requirements of the National Historic Preservation Act (NHPA). The MOA outlines the activities that EPA will perform to further excavate, interpret, and curate portions of the archaeological site. These activities include additional archaeological field investigations extending over 200 square meters, reports addressing the scientific and cultural value of the recovered materials, and generation of popular reporting materials to transmit the findings to the public.

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EPA does not have the authority to provide the Passamaquoddy with site-specific Superfund money for educational and interpretive activities. EPA staff will work with the Passamaquoddy to develop such materials and perform educational activities. The TOSC (technical outreach services to communities) program that has been used by the Passamaquoddy for review of the Site documents may be able to assist with the review of the work of the EPA contract archaeologist. It is unlikely that EPA will finance display activities other than the initial curation of the artifacts and a possible educational display at the Site. The public outreach activities are described in the Cultural Resource Management Plan that was issued in early March 2000.

Comment 7: The Tribe requests the National Advisory Council on Historic Preservation review the matter pertaining to the artifacts and jurisdiction.

Response: EPA sent a letter to the Advisory Council on Historic Preservation (ACHP) on April 12, 2000 notifying the ACHP of the issues relating to this Site and inviting it to participate in the NHPA process. EPA received notification of the ACHP decision to become involved at the Site on April 27, 2000. The Advisory Council determined that, while it would be beneficial for the ACHP to enter into the consultation process to finalize the MOA, the ACHP will not offer an opinion regarding ownership of the artifacts. As discussed in the response to comment #4, however, both the MOA and the ownership of the artifacts have been resolved.

Comment 8: The human health risk assessment did not consider risks from tribal uses of aquatic or upland plants. Monitoring is recommended.

Response: One of the Passamaquoddy consultants stated that “members of the Passamaquoddy tribe [sic] are concerned about use of aquatic plants from Meddybemps lake [sic], which they harvest and use for making baskets...” Also, sweetgrass, or *Hierochloe odorata*, could be harvested and burned and the smoke inhaled during prayer or ceremony. However, the consultant also stated that “although it is unlikely that aquatic plants take up mercury, PCBs, and other COPCs in the Lake at concentrations high enough to cause harm in people who harvest or use those plants, there is no objective evidence in the risk assessment that contact with these plants is not an exposure pathway.” The plant exposure pathway was not evaluated for several reasons. First, site-related contaminants in soils and sediments where these plants grow are unlikely to bioaccumulate to levels high enough to result in harm to humans that may touch or inhale smoke from burning these plants. A major bioaccumulative compound found in sediment areas is PCBs. However, all PCB levels in sediment areas near where aquatic plants might grow are very low (i.e., below 1 ppm). Chemicals can be taken up into plants in three ways; uptake from the soil through the roots and translocation to the aerial parts of plants, deposition of atmospheric particulates onto plant surfaces, or uptake of airborne vapors by plant parts. The uptake of PCBs from soils is estimated to be fairly low (O’Connor *et al.*, 1990) and thus the translocation pathway is not thought to be an important transport route for PCBs in plants. The main uptake pathways of PCBs for

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plants appears to be the uptake of airborne vapors by plant parts (ATSDR, 1999). Overall the uptake of PCBs by plants from contaminated soils has been found to be negligible by several investigators (Gan and Berthouex, 1994; Webber *et al.*, 1994; Yee *et al.*, 1992). In addition, studies of uptake from soils highly contaminated with PCBs (i.e., PCBs 38-157 ppm) in the Housatonic River valley area of Western Massachusetts indicate that uptake of PCBs in fiddlehead ferns (another plant harvested for consumption) is 1000 times or more lower in plants than in the soil. This further supports findings from other studies that uptake of PCBs into plants from soils is fairly low (Potter *et al.*). By contrast the highest concentration of PCBs in on-site surface soils at the Eastern Surplus site is 1.9 ppm (mean = 0.27 ppm), for Meddybemps Lake sediments is 0.05 ppm, for the Mill Pond sediments is 2 ppm (mean = 1.2 ppm) and for the upper Dennys River sediments is 0.5 ppm (mean = 0.1 ppm). The uptake into plants from such low levels is likely to be extremely low presenting negligible risks to individuals handling these plants.

Second, the type of exposure mentioned (i.e., handling for basket weaving, occasionally placing plant in mouth) is unlikely to result in significant exposures for such low levels of contaminants. Burning of grass could be problematic if significant levels of contaminants were present in sweetgrass, but as mentioned above this is highly unlikely given the low levels of on-site contaminants.

And third, based on discussions with environmental officers for both Passamaquoddy communities, tribal game wardens, and state game wardens, it appears that the Site is not regularly used for fishing since more prime fresh- and salt-water fishing areas are located closer to the Passamaquoddy communities.

Comment 9: The human health risk assessment does not consider risks to Passamaquoddy members from hunting and eating locally caught game which could bioaccumulate contaminants by eating contaminated fish. Some of these species include game birds such as duck and geese and other fish eating animals such as bear and racoon.

Response: The risk assessment did not evaluate exposure and risk from ingestion of game animals at the Site for several reasons. First, the concentration of bioaccumulative contaminants in on-site surface soils is too low to result in significant concentration of contaminants in the vegetation such that the game animals would accumulate high enough levels of these contaminants to be harmful to human consumers. The game animals mentioned in the comment letter included bear, racoon, deer, moose and ducks/geese. A second route of exposure for some of these animals is the ingestion of fish which have accumulated site-related contaminants present in surface water and sediments in their tissues. Of the game animals mentioned above, only bear and racoon would ingest fish. For both of these species, fish is a very small part of their diet (<or equal to 2%). In fish, the major bioaccumulative contaminants are mercury and PCBs. Mercury in fish is due to atmospheric deposition and is not site-related. PCBs are at very low levels in fish and unlikely to result in harmful levels to human consumers of bear and racoon.

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However, to fully evaluate this pathway, specific exposure information is needed. For example, what animals would tribal members eat, how much of each animal, what part would be consumed, etc.

Second, the Eastern Surplus Site is only 5 acres and surrounding areas that could be impacted by environmental contamination (and where plants grow) is minimal. Even if the site-impacted soils and sediments were contaminated with higher levels of bioaccumulative compounds, the area is too small to be a significant part of the game eating range. Thus, only a small portion of their total food intake would consist of site-contaminated plants.

And third, prior to conducting the baseline risk assessment, discussions with the environmental officers for both Passamaquoddy communities, tribal game wardens and state game wardens indicated that the Passamaquoddy members are infrequent fishers of Meddybemps Lake, Dennys River and Mill Pond. There are several prime fresh- and salt-water fishing bodies much closer to the reservation which are more frequently used by the tribe. Thus ingestion of game was not evaluated because likelihood of significant exposure via this pathway was considered small.

Comment 10: The VOCs present in the sediment should be addressed in the risk assessment.

Response: VOCs were detected at very low concentrations and frequencies in sediments sampled in Meddybemps Lake, Mill Pond and the upper Dennys River. All VOCs were evaluated and screened out from a quantitative evaluation in the risk assessment since measured concentrations were well below human health levels of concern.

Comment 11: The risk assessment did not evaluate risks from eating fish for children or adolescents or for fetuses or pregnant woman.

Response: The risks to adolescents from eating fish is not expected to be significantly different than the risk to adults due to small difference between adolescents and adults in terms of body weight, ingestion rates and other physiological parameters. Thus a separate exposure scenario for adolescent ingestion of fish was not evaluated.

Children may be more or less sensitive than adults to certain environmental pollutants for several reasons: 1) children eat more food and drink more water per unit body weight than do adults, 2) the variety of food children consume is often more limited than adults, 3) children's bodies are not yet fully developed, so exposure to toxic substances may affect their growth and development.

Separate risks to children for exposure to fish were not quantitatively evaluated because of the uncertainty in such an evaluation. Generally, there is little information which can quantitatively be applied to account for differences in toxicity to children as opposed to adults (however, for methyl

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mercury, the chronic toxicity endpoint assessed was for developmental effects in infants). Also, the existing information for ingestion rates of freshwater fish by children is highly variable and uncertain. Lastly, the State of Maine currently has a health advisory for methyl mercury for all freshwater lakes and streams, including Meddybemps Lake and the Dennys River, making frequent ingestion of fish by children unlikely. The health advisory states: “Pregnant women, nursing mothers, women who plan to become pregnant, and children less than 8 years of age, should not eat WARM water fish species caught in any of the Maine inland surface waters; consumption of COLD water fish species should be limited to 1 meal per month.” Although this advisory is based on methyl mercury, EPA believes it is protective for sensitive populations exposed to *all* contaminants in fish in Meddybemps Lake and the Dennys River. The State has been reviewing all fish advisories and will issue new advisories in the spring. The new advisories for sensitive populations are expected to change little from the current advisory for methyl mercury and should remain protective of sensitive subpopulations for all contaminants.

If a rough, uncertain and conservative estimation of risks to children of freshwater recreational fisherman were conducted, the conclusions of EPA’s baseline risk assessment would not change and the State’s existing health advisory would remain appropriate. Very few studies in the literature report high end values for freshwater fish ingestion rates for young children (i.e., < 6 years of age). However, some studies (EPA, 1996; West, *et al.*, 1989) indicate that the ingestion rate of children of 1-5 yrs would be roughly half that of EPA’s recommended adult freshwater fish ingestion rate of 25 g/dy. If this were the case, cancer risks to children from all contaminants in Meddybemps Lake and Dennys River fish would be 2 times lower than that of an adult. For noncancer effects, children’s risks would be 2.6 times greater than that of an adult. The risk assessment concluded that most fish in Meddybemps Lake and Dennys River would pose a risk to adult recreational fisherman due mainly to mercury. Mercury affects the central nervous system and would pose additional risks to young children whose central nervous system is more vulnerable to toxins. In addition, due to increased fish intakes in children relative to body weight, noncancer risks due to mercury would be 2.6 times higher than adults. Thus, ingestion of fish by children could result in harmful effects, and children, pregnant women, nursing mothers and women who plan to become pregnant should continue to follow the State’s health advisory for fish on Meddybemps Lake and the Dennys River.

If subsistence fishing were to occur in the future on Meddybemps Lake or the Dennys River, there would still be an unacceptable risk from ingesting fish, except the risks would be greater than those predicted in the risk assessment and above. In this case, assuming the size of fish meals remains the same, following the State’s health advisory should ensure adequate protection for all populations.

Comment 12: The Risk assessment should add risks from drinking groundwater to those from eating fish. Also, risks from eating fish should be added to those from exposure to surface water and sediment.

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Response: In calculating the Reasonable Maximum Exposure (RME) risk to an individual, risks are only added for pathways in which it is likely that the same individual receiving the highest exposure to one media would also be receiving the highest exposure to another. It is unlikely that the individual eating the fish with the highest concentration is also the individual consuming the highest concentrations of all contaminants present in groundwater. Indeed no individual currently residing near the Eastern Surplus site has a drinking water well in the most contaminated part of the groundwater plume, nor is this likely to happen in the future. In addition, fish concentrations and thus risks vary depending on which fish, which species, which size and where fish are caught. In addition, the risks from groundwater ingestion are well outside of EPA's target risk range and would remain outside of EPA's risk range even with the addition of other exposure pathways to the groundwater risk. The baseline risk assessment also concludes that risks from ingesting fish exceed EPA's target risk range due to the presence mainly of mercury. Thus, even if risks were added, these would not change conclusions about risks for either the groundwater or fish pathway.

Surface water and sediment concentrations of site-related contaminants is very low. The Meddybemps Lake and Dennys River area is fairly large. The likelihood that individuals ingesting the most highly contaminated fish also receive exposure to the most highly contaminated soils and sediments is low. Thus pathways were not added.

Comment 13: The risk assessment does not provide a quantitative assessment of risks from showering and inhaling volatiles from groundwater. This risk is likely to double the risks from drinking the water.

Response: Inhalation risks from showering uses of groundwater and surface water were discussed in the text on pages 5-6 and 5-8 of the Human Health Risk Assessment, respectively. In these sections, the risks from ingestion of water was doubled to account for the additional risks from inhalation of volatile compounds from water. Also, the impact of inhalation risks on total risks from groundwater and surface water were discussed.

PART 3. SUMMARY OF STATE OF MAINE COMMENTS

Comments 1 to 12 concern the Remedial Investigation Report.

Comment 1: The final RI document contains usage, tense and other grammatical errors. Only a limited number of these types of corrections are noted in the comments that follow.

Response: Comment is noted that there are typographic and grammatical errors in the text.

Comment 2: Regarding page E-14, section E.7.1, second paragraph, third sentence--the State of

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Maine's drink water criteria are called "maximum exposure guidelines" (MEGs) not "maximum exposure criteria" as used in the text here.

Response: EPA acknowledges that the correct phrase is "maximum exposure guidelines."

Comment 3: Regarding page 1-9, section 1.2.4--as requested in the May 24, 1999 letter, please provide the ME DEP with the Weston document [Non-Time Critical Removal Action, Eastern Surplus Company Superfund Site, Meddybemps, Maine (Weston 1999)] referenced in the text.

Response: The State of Maine has been provided with the final NTCRA Report.

Comment 4: Regarding page 2-4, section 2.2.1: Weston/START 1997, first paragraph, third sentence--the sentence should read "a groundwater seep in the small..." instead of "a groundwater seed area in the small..."

Response: "seed" will be corrected to "seep." Noted in the Errata sheet.

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Comment 5: Regarding Section 4, as previously stated in the ME DEP's May 24, 1999 letter to EPA (specifically comment #7)--throughout this section the text refers to MCLs. Infrequently, the text refers to exceedences of the State of Maine's MEGs. In accordance with past EPA decisions, the MEGs are an "Appropriate & Relevant" requirement. As such, language throughout this section and elsewhere in the document should include language that discusses any exceedance of the Maine's MEGs. Please note that the ME DEP is expecting the Maine Department of Human Services to finalize and release an updated version of the State of Maine's MEG listing. The ME DEP will provide this list to EPA as soon as possible.

Response: The Section 4 narratives do discuss exceedances of the MEGs for overburden and groundwater. The narratives for each aquifer zone of interest, for each contaminant grouping (VOCs, SVOCs, pesticides/PCBs, and metals), identify which chemicals were detected and whether the MCLs or MEGs were exceeded. Comparison of groundwater analytical results to both MCLs and MEGs are also presented in Tables 4-8, and in Tables 4-10A through 4-10D.

It is acknowledged that the 1992 MEGs are considered to be applicable or relevant and appropriate requirements (ARARs) because the Maine Standards for Hazardous Waste Facilities (which incorporated by reference the 1992 MEGs) are relevant and appropriate for the Site. The recent revised MEGs are not considered ARARs per discussions with the State of Maine Department of the Attorney General. Groundwater quality and ARARs were evaluated together in the Feasibility Study Report to develop remedial action objectives and chemical-specific remediation goals.

Comment 6: Regarding page 4-9, Section 4.3.1.3, middle paragraph, fifth sentence--trichloroethene is repeated. Was the second one supposed to be tetrachloroethene or was trichloroethene inadvertently listed twice? Clarify text.

Response: The term "trichloroethene" was repeated twice; the correct phrase is "tetrachloroethene and trichloroethene."

Comment 7: Regarding page 4-46, Section 4.4.6--the sentence should read: "The overall types and distribution of SVOCs for each bedrock aquifer zone is discussed." not "The overall types and distribution of SVOCs for each overburden aquifer zone is discussed".

Response: Comment noted. The correct reference is to the bedrock.

Comment 8: Regarding page 4-78, section 4.8, second paragraph--as previously stated in the May 24, 1999 letter to EPA, it was noted that sediment effect levels developed by the National Oceanic and Atmospheric Administration (NOAA) are moderately conservative ecological

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screening values for contaminants in sediments. While true, the NOAA values are for estuarine/marine environments. Similar ecological benchmarks have been developed for freshwater systems by the Ontario Canada Ministry of the Environment. The Ontario Ministry values should be used for screening contaminants in freshwater sediments.

Response: The ME DEP is correct in noting that the NOAA ER-M values are more appropriate for evaluating estuarine and marine sediments. Section 4 of the RI only used the NOAA ER-M values for discussion purposes. The Ontario Ministry of the Environment's (OME) benchmark values (LELs, and SELs) would be more appropriate for comparison purposes. The OME values were used and are presented in the Ecological Risk Assessment (ERA) as a screening benchmark.

Comment 9: Regarding page 5-22, section 5.3.1, top paragraph--what about the transport of VOCs through the bedrock to the east side of the Dennys River? Within the last year, contaminants have been detected in two (2) of the monitoring wells on the eastern side of the Dennys River.

Response: The potential transport of VOCs through the bedrock aquifer to the east side of the river is being assessed by EPA and Tetra Tech NUS through a supplemental bedrock investigation program. This field program was initiated in late November 1999 and was concluded in mid-January 2000. Additional deep bedrock boreholes have been advanced on-site and on the east side of the river to provide monitoring wells. Borehole geophysics and discrete interval sampling were conducted. Groundwater samples were collected from monitoring wells and from discrete bedrock fractures.

Although tetrachloroethene (PCE) was detected in two monitoring wells situated east of Mill Pond, it is uncertain whether its presence could be attributed to offsite migration or to potential cross contamination during sampling or hydrologic measurements. The two wells were purged and re-sampled twice in December 1999. No VOCs were detected during either of those instances. These results strongly suggest cross contamination. Low level detection of VOCs have been noted in a subsequent sample indicating that some transport across the river may be possible. This further supports the need for the groundwater extraction and treatment system.

Comment 10: Regarding page 5-26, section 5.3.4, top of page--what do the units for aluminum concentration mean? Is this a typographical error and should the units really be ug/l? Clarify.

Response: Phi (f) should be replaced by mu (m), the correct symbol. Apparently, the incorrect Greek symbol was used because different software or printers were used to print the document.

Comment 11: Regarding page 6-1, section 6, top paragraph--the date of the Draft Eastern Surplus Superfund Site Ecological Risk Assessment should read "July 1999" instead of "January

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1999.”

Response: The date of the Draft Eastern Surplus Company Superfund Site Ecological Risk Assessment,” as cited in the RI report, is correctly dated January 1999, not July 1999 as noted in the ME DEP comment.

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Comment 12: Regarding Final RI, Volume II of IV – Table and Figures, Tables 4-10A, 4-10B, 4-10C, and 4-10D--under the column headed “MEG,” the MEG for the compound, vinyl chloride, is not included. The MEG entry for vinyl chloride on these tables should read “0.15” ug/l.

Response: The MEG for vinyl chloride (0.15 ug/L) was inadvertently omitted from the groundwater data tables. A review of the data indicates that detection limit for vinyl chloride was typically 1 ug/L and therefore detection of this VOC to 0.15 ug/L was not possible. Vinyl chloride was detected in only one groundwater sample, which was collected from the MW-23M well in November 1998 at 0.9 mg/L. A brief discussion of the single detection of vinyl chloride is presented in Section 4.4.4.4 in the RI.

Comments 13 to 24 concern Volume III of IV of the Final RI (Human Health Risk Assessment (HHRA)).

Comment 13: Specify soil cleanup levels used for the Non-Time-Critical Removal Action (NTCRA).

Response: Soil cleanup levels for the Non-Time-Critical Removal Action (NTCRA) are presented on page 1-7 of Final RI, Volume I. The HHRA, Volume III of the RI, draws on information presented in the other volumes of the RI.

Comment 14: Include seep water in the assessment or explain why exposure to this medium is not expected.

Response: Seep water analytical results were not included in the HHRA because exposures to the groundwater seeps are unlikely. The seep samples were obtained from an area located near the bottom of a steep slope, where groundwater gradually discharges through several seeps. This area is characterized as being somewhat rocky and not readily accessible for recreational purposes. The samples were obtained from trickles of water emanating from the seeps and from very small puddles. These trickles of water quickly enter Mill Pond, where any contaminant is quickly diluted by fast-moving water. A groundwater extraction system has been installed just upgradient of this location and was activated on January 24, 2000. This extraction system is expected to greatly reduce, if not completely stop, the further migration of contaminated groundwater into the Dennys River. It is likely that the groundwater seeps will also be greatly reduced or eliminated.

It was therefore concluded that the groundwater seep samples are not representative of concentrations in surface water at a potential point of contact.

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Comment 15: Include Maine's health risk-based Maximum Exposure Guidelines (ME DEP/DHS, 1994) in the analysis of groundwater contaminants. This would be in document sections where potential risks are evaluated, contaminants of potential concern (COPCs) are identified, and substances that exceed applicable or relevant and appropriate requirements (ARARs) are identified.

Response: COPC selection for surface water exposures was based on comparing exposure point concentrations to the EPA Region III Risk Based Concentrations (RBCs) for tap water ingestion and to the MCLs. Both sets of values are conservative, risk-based concentrations. Inclusion of MEG values to further screen COPCs and evaluate risks in the risk assessment would have increased the COPC list by four chemicals only (aluminum, iron, 1,1-dichloroethane and xylene). Inclusion of these chemicals would not have changed the risks significantly since EPA does not have strong toxicological data to support a toxicity evaluation for aluminum or iron. The other two chemicals are well below their MCLs or risk-based levels. MEGs have been used in setting remediation goals for this Site. It is EPA policy to rely upon EPA national and regional guidance in the development of risk assessments at Superfund sites.

Comment 16: To be consistent with State guidance, the number of hours per day in contact with surface water should be 1.0 hours for central tendency exposure (CTE) estimates and 2.6 hours for reasonable maximum exposure (RME) estimates (0.5 and 1.0, respectively, were used in the assessment).

Response: The exposure time for contact with surface water was derived by assuming a swimming scenario and adopting recommendations for swimming time provided in the Exposure Factors Handbook (1997). The values of 1 hour for the RME and 0.5 hour for the central tendency are considered reasonably conservative for Meddybemps Lake and upper Dennys River.

Comment 17: Both the RME and CTE soil-to-skin adherence factors for children should be 0.2 mg/cm²-event.

Response: Soil-to-skin adherence factors were obtained from the latest EPA draft dermal guidance which has received extensive internal and external peer review. The values in this guidance are based on the latest information regarding dermal adherence provided in the Exposure Factors Handbook. This information supports different, rather than the same, values for RME and CT adherence values in children.

Comment 18: Correct apparent error in equation for calculating dermal uptake of inorganics.

Response: In the equation for calculating dermal uptake of inorganics from surface water and/or

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groundwater, presented on page 3-21 of Final RI Volume III, the conversion factor of 10^{-3} L/cm³ was inadvertently omitted. The risk calculations did include this factor.

Comment 19: Correct soil to skin adherence factors for adults in Tables 4.1, 4.3, and 4.4 (change from 0.07 to 0.03).

Response: Soil-to-skin adherence factors were obtained from the latest EPA draft dermal guidance which has received extensive internal and external peer review. The values in this guidance are based on the latest information regarding dermal adherence provided in the Exposure Factors Handbook. This information supports different, rather than the same, values for RME and CT adherence values in children.

Comment 20: Compare the estimated incremental lifetime cancer risks (ILCRs) with the target risk level used by the ME DEP (1×10^{-5}) and develop conclusions/recommendations based on those comparisons.

Response: EPA's basis for making decisions as to whether a remedial action should be undertaken is based in part on EPA's target risk range of 10^{-4} to 10^{-6} . While EPA is aware of the State of Maine risk level of 10^{-5} , EPA's policy is to follow the target risk range.

Comment 21: The ME DEP included a discussion in the comment regarding the different risk assessment conclusions that would result from the use of the 10^{-5} risk level.

Response: EPA finds this information interesting. However, as previously stated, the EPA risk range is the basis for an EPA Superfund action.

Comment 22: The RME risk estimate for fishermen exceed the EPA target risk levels (a correction is needed).

Response: RME risk estimates for fishermen are slightly above 1.0×10^{-4} . These levels are in the 10^{-4} to 10^{-6} risk range. EPA's published guidance states that risks in the 10^{-4} to 10^{-6} risk range are acceptable. This has variously been interpreted as 1.0×10^{-4} to 1.0×10^{-6} or simply as 10^{-4} to 10^{-6} . Under the latter interpretation, RME risks to fishermen are within the acceptable range. However, since other scenarios with cancer risk estimates of similar magnitude were listed as exceeding the acceptable range, a correction of the interpretation of risks to fishermen is in order.

Comment 23: The major contributor to cancer risks in soils is arsenic (not stated in the assessment).

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Response: EPA does not typically identify major risk contributors when the incremental excess risk is within the target risk range. However, the comment is correct that arsenic is the major contributor to risk in soils. However, arsenic appears to be naturally occurring in Site soils.

Comment 24: It is stated that the major contributor to cancer risk in surface water is arsenic. To be more precise arsenic was the only contributor to cancer risk in surface water.

Response: We concur that arsenic is the ONLY contributor to cancer risk in surface water. In addition, arsenic was infrequently detected and was only detected at concentrations below the federal MCL and State MEG. Noted in the Errata.

Comments 25 to 26 concern the Ecological Risk Assessment.

Comment 25: It is still unclear why results of analyses on soils collected in 1998 were not discussed.

Response: The data used in the ERA was based upon the pre-NTCRA data base. It was not considered necessary to include this data in the ERA.

Comment 26: It was noted that the data on samples of soil that has already been removed were not included in the assessment (page 2-8). Although acceptable, it is not clear when the material in question (soil) was removed. It is understood that the planned soil removal has been completed.

Response: All contaminated soils were removed by December 1999.

Comments 27 to 42 concern the Final Feasibility Study Report (dated August 1999).

Comment 27: The Final FS contains usage, tense and other grammatical errors. Only a few of these types of corrections are noted in the comments that follow.

Response: Comment noted..

Comment 28: The risk scenarios include risks “to fishermen that fish in the water bodies adjacent to the site.” Were the risks evaluated associated with the act of fishing - wading, contact with water, etc. If the risks are associated with fish consumption, it is possible that persons other than the fisherman consume the fish - family members, including children.

Response: Risks to recreational fishermen were evaluated for the ingestion of fish pathway. Fishermen

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may or may not receive substantial exposure to surface water and sediments. Risks from direct contact with surface water and sediment were evaluated separately in the risk assessment for the adult and child recreational receptor. It is possible that other receptors may ingest fish, such as children.

Separate risks to children for exposure to fish were not quantitatively evaluated because of the uncertainty in such an evaluation. Generally, there is little information which can quantitatively be applied to account for differences in toxicity to children as opposed to adults (however, for methyl mercury, the chronic toxicity endpoint assessed was for developmental effects in infants). Also, the existing information for ingestion rates of freshwater fish by children is highly variable and uncertain. Lastly the State of Maine currently has a health advisory for methyl mercury for all freshwater lakes and streams, including Meddybemps Lake and the Dennys River, making frequent ingestion of fish by children unlikely. The health advisory states: "Pregnant women, nursing mothers, women who plan to become pregnant, and children less than 8 years of age, should not eat WARM water fish species caught in any of the Maine inland surface waters; consumption of COLD water fish species should be limited to 1 meal per month." Although this advisory is based on methyl mercury, EPA believes it is protective for sensitive populations exposed to *all* contaminants in fish in Meddybemps lake and the Dennys River. The State has been reviewing all fish advisories and will issue new advisories in the spring. The new advisories for sensitive populations are expected to change little from the current advisory for methyl mercury and should remain protective of sensitive subpopulations for all contaminants.

If a rough, uncertain and conservative estimation of risks to children of freshwater recreational fisherman were conducted, the conclusions of EPA's baseline risk assessment would not change and the State's existing health advisory would remain appropriate. Very few studies in the literature report high end values for freshwater fish ingestion rates for young children (i.e., less than six years of age). However, some studies (EPA, 1996; West *et al.*, 1989) indicate that the ingestion rate of young children would be roughly half that of EPA's recommended adult freshwater fish ingestion rate of 25 g/dy. If this were the case, cancer risks to children from all contaminants in Meddybemps Lake and Dennys River fish would be 2 times lower than that of an adult. For noncancer effects, children's risks would be 2.6 times greater than that of an adult. The risk assessment concluded that most fish in Meddybemps Lake and Dennys River would pose a risk to adult recreational fisherman due mainly to mercury. Mercury affects the central nervous system and would pose additional risks to young children whose central nervous system is more vulnerable to toxins. In addition, due to increased fish intakes in children relative to body weight, noncancer risks due to mercury would be 2.6 times higher than adults. Thus, ingestion of fish by children could result in harmful effects, and children, pregnant women, nursing mothers and women who plan to become pregnant should continue to follow the State's health advisory for fish on Meddybemps Lake and the Dennys River.

Comment 29: Regarding page 2-4, section 2.1.1--reference should read "Appendix A" instead

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of "Appendix A-1."

Response: Comment noted.

Comment 30: Regarding page 2-11 and 2-12, section 2.2.5.1--are the concentration units as presented correct? The Greek symbol for the letter phi is used with g/l. Should the concentration units read ug/l instead? Explain or correct units.

Response: These were typographic errors. Phi (f) should be replaced by mu (m), the correct symbol. Apparently the incorrect Greek symbol was used because different software or printers were used to print the document.

Comment 31: Regarding page 2-15, section 2.2.7--the NTCRA removed soils contaminated with PCB concentrations greater than 2 mg/kg not 2 ug/kg. Correct.

Response: The PCB action level was incorrectly identified as 2 ug/kg. The correct value is 2 mg/kg. Comment noted.

Comment 32: Regarding page 2-15, section 2.2.7--fish advisories are generated by the Bureau of Health, not the Board of Health.

Response: The Maine Bureau of Health was incorrectly referenced as the Maine Board of Health. Comment noted.

Comment 33: Regarding page 2-44 through 2-50, section 2.5.3.7--as previously stated in ME DEP's June 3, 1999 letter, the State of Maine's acceptance of any treatment that involves the injection of chemicals into the ground is dependent upon initiating and maintaining hydraulic control of the area where treatment with chemicals is occurring.

Response: The ME DEP's concerns regarding the injection of chemicals at the site have been noted. The groundwater extraction system will be used to prevent the release of contaminants into the Dennys River or Meddybemps Lake.

Comment 34: Regarding pages 2-51 to 2-52, section 2.5.3.8, concerning on-site beneficial reuse--as stated previously in the ME DEP's June 3, 1999 letter, any on-site reuse of treated water must not create surface water runoff (preferential pathways) that would discharge to a surface water body (i.e., Meddybemps Lake and Dennys River). Also, in addition to the MCLs, any

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treated water that is discharged must meet the MEGs.

Response: The EPA has received the letter concerning the ME DEP's position that pollutants cannot be discharged directly to the Class AA River. The planned disposition of treated groundwater is on-site discharge into an infiltration gallery. The treatment system is designed to remove VOCs and manganese to below MCLs and MEGs; the treated water quality will be comparable to drinking water quality. Any water used for re-injection will either meet the performance standards for discharge or be injected within the area of hydraulic control.

Comment 35: Regarding page 3-3, section 3.1.3--what about VOCs in excess of the MEGs?

Response: VOCs detected in private residential wells do not exceed MCLs or MEGs.

Comment 36: Regarding page 3-5, section 3.1.5--please note that the ME DEP understands that the revised MEG for manganese is to be 500 ppb as opposed to the existing level of 200 ppb.

Response: EPA appreciates the information. However, the 1992 MEG list is the ARAR. Therefore the value of 200 ug/l will be used as the performance standard unless a higher background level can be established.

Comment 37: Figures 3-1, 3-2, and 3-4 are incorrectly referenced as Tables 3-1, 3-2, and 3-4.

Response: Comment noted .

Comment 38: Regarding page 3-14, section 3.2.3--please note that the ME DEP understands that the revised MEG for manganese is to be 500 ppb as opposed to the existing level of 200 ppb.

Response: EPA appreciates the information. However, the 1992 MEG list is the ARAR. Therefore the value of 200 ug/l will be used as the performance standard unless a higher background level can be established.

Comment 39: Regarding page 3-18, section 3.2.4--Figure 3-7 was incorrectly referenced as Table 3-7.

Response: Comment noted .

Comment 40: Regarding page 3-22, section 3.2.4--please note that the ME DEP understands

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that the revised MEG for manganese is to be 500 ppb as opposed to the existing level of 200 ppb.

Response: EPA appreciates the information. However, the 1992 MEG list is the ARAR. Therefore the value of 200 ug/l will be used as the performance standard unless a higher background level can be established.

Comment 41: Regarding page 4-12, section 4.1.2--GW-2 was incorrectly referenced as GW-1.

Response: Comment noted.

Comment 42: Regarding page 4-16, Section 4.1.3--GW-3 was incorrectly referenced as GW-1.

Response: Comment noted .

**E. THE SELECTED REMEDY'S CHANGES TO THE PROPOSED REMEDY MADE
BASED UPON PUBLIC COMMENTS**

There have been no significant changes to the Proposed Remedy as a result of public comments. The local public was in support of EPA's Proposed Remedy. The State of Maine and the Passamaquoddy Tribe were both supportive of this Proposed Remedy. The Passamaquoddy Tribe's request for long-term monitoring to address certain concerns are consistent with the monitoring anticipated as part of the Proposed Remedy.

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APPENDICES

APPENDIX A

TABLES AND FIGURES

TABLE 1
SUMMARY OF ONSITE SOIL DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
Volatile Organic Compounds					
2-Butanone	UG/KG	9 / 71	23	6 J	64 JTB
2-Hexanone	UG/KG	5 / 71	2.4	1 J	4 J
4-Methyl-2-Pentanone	UG/KG	3 / 71	3.3	1 J	5 J
Acetone	UG/KG	17 / 71	280	50 J	970 J
Benzene	UG/KG	3 / 668	240	130	330
Bromomethane	UG/KG	6 / 71	1.2	1 J	2 J
Carbon Disulfide	UG/KG	5 / 71	2.8	0.9 J	4 J
Ethylbenzene	UG/KG	8 / 668	1300	41	3700
m&p-Xylene	UG/KG	10 / 597	3100	6	11000
Methylene Chloride	UG/KG	3 / 668	2.7	2 J	3 J
o-Xylene	UG/KG	8 / 597	3600	1800	8700
Tetrachloroethene	UG/KG	61 / 668	20	1 J	60
Toluene	UG/KG	38 / 668	250	1 J	3700
Total Xylenes	UG/KG	13 / 71	2.1	0.7 J	6 J
Trichloroethene	UG/KG	21 / 668	5	1 J	13
Semi-Volatile Organic Compounds					
2,2'-oxybis(1-Chloropropane)	UG/KG	2 / 56	51	45 J	57 J
2-Methylphenol	UG/KG	1 / 56	61	61 J	61 J
3,3'-Dichlorobenzidine	UG/KG	1 / 56	49	49 J	49 J
Acenaphthylene	UG/KG	2 / 56	46	32 J	60 J
Anthracene	UG/KG	2 / 56	60	22 J	96 J
Benzo(a)anthracene	UG/KG	4 / 56	220	44 J	660
Benzo(a)pyrene	UG/KG	2 / 56	270	140 J	400 J
Benzo(b)fluoranthene	UG/KG	4 / 56	280	69 J	830
Benzo(g,h,i)Perylene	UG/KG	2 / 56	130	66 J	190 J
Benzo(k)fluoranthene	UG/KG	2 / 56	460	150 J	780
Bis(2-Chloroethyl)ether	UG/KG	1 / 56	77	77 J	77 J
bis(2-Ethylhexyl)phthalate	UG/KG	9 / 56	320	33 J	2400
Butylbenzylphthalate	UG/KG	1 / 56	23	23 J	23 J
Carbazole	UG/KG	5 / 56	53	46 J	63 J
Chrysene	UG/KG	4 / 56	320	67 J	920
Di-n-Butylphthalate	UG/KG	6 / 56	86	22 J	200 J
Dibenzo(a,h)Anthracene	UG/KG	2 / 56	110	46 J	180 J
Diethylphthalate	UG/KG	2 / 56	37	20 J	54 J
Fluoranthene	UG/KG	4 / 56	360	24 J	1000
Indeno(1,2,3-cd)pyrene	UG/KG	2 / 56	220	96 J	340 J
Phenanthrene	UG/KG	6 / 56	94	26 J	210 J
Pyrene	UG/KG	7 / 56	310	22 J	1400 J
Total PAH	UG/KG	7 / 56	1400	22	7068

TABLE 1
SUMMARY OF ONSITE SOIL DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects			Average of Detects	Minimum Detected Value	Maximum Detected Value
Pesticides							
4,4'-DDT	UG/KG	4	/	77	8.7	4.9	11 J
DDT, Total	UG/KG	4	/	77	8.7	4.9	11
Endosulfan II	UG/KG	1	/	78	18	17.7	17.7
Endosulfan Sulfate	UG/KG	1	/	78	4.1	4.1	4.1
Endrin	UG/KG	1	/	78	8.2	8.2 J	8.2 J
Endrin Aldehyde	UG/KG	3	/	78	13	5.81	19
Endrin Ketone	UG/KG	2	/	78	28	9.9	46 J
PCBs							
Aroclor, Total	UG/KG	124	/	1114	470	3.3	1900
Aroclor-1254	UG/KG	12	/	1114	550	100 J	1900 E
Aroclor-1260	UG/KG	115	/	1114	450	3.3 J	1800
Dioxins							
Sum of Dioxin Homologs	NG/KG	13	/	17	21.1	2.085	64.025
Total HpCDD	NG/KG	1	/	17	0.55	0.55 J	0.55 J
Total TCDF	NG/KG	13	/	17	3	0.4 J	7.28 J
Toxicity Equivalency	NG/KG	5	/	17	0.98	0.043 J	2.14 J
Metals							
Antimony	MG/KG	39	/	90	1.2	0.54 J	3.8
Arsenic	MG/KG	112	/	703	19.1	4.3	43
Barium	MG/KG	106	/	106	44.8	9.8 J	563
Beryllium	MG/KG	88	/	98	0.4	0.19 B	0.75
Cadmium	MG/KG	74	/	1111	32.1	0.13 B	13.2
Chromium	MG/KG	224	/	1115	233	8.5	182
Cobalt	MG/KG	106	/	106	10.3	4.4 B	39.8 J
Copper	MG/KG	98	/	106	18.7	7.4	144
Cyanide	MG/KG	2	/	46	3.5	0.88	6.1
Iron	MG/KG	106	/	106	22500	9880	43100
Lead	MG/KG	183	/	1115	62	1.5	330
Magnesium	MG/KG	106	/	106	4990	2280	28900
Manganese	MG/KG	106	/	106	457	118	1170
Mercury	MG/KG	20	/	104	0.12	0.05 J	0.33
Nickel	MG/KG	99	/	106	24.5	9.4	115
Selenium	MG/KG	10	/	104	0.68	0.4 B	1.1 J
Silver	MG/KG	51	/	98	0.57	0.18 B	1.4 J
Thallium	MG/KG	13	/	103	0.88	0.17 J	1.5 B
Vanadium	MG/KG	106	/	106	24.2	11.7 B	99.6
Zinc	MG/KG	96	/	106	74.2	24.6	430

Notes:

Summary based on soils remaining on site after completion of 1999 EPA removal action.
VOCs, metals, and PCBs data include analyses from on-site laboratory.

TABLE 2
SUMMARY OF SURFACE WATER DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
MEDDYBEMPS LAKE - NEAR SITE					
VOCs					
Acetone	UG/L	3 / 3	2.3	2 JB	3 JB
SVOCs					
bis(2-Ethylhexyl)phthalate	UG/L	1 / 6	1	1 J	1 J
METALS					
Aluminum	UG/L	5 / 7	338	36.5 B	852
Antimony	UG/L	1 / 7	5.3	5.3 B	5.3 B
Arsenic	UG/L	1 / 7	3.8	3.8	3.8
Barium	UG/L	2 / 7	5.7	5.6	5.9
Calcium	UG/L	7 / 7	2620	2300 B	2980
Chromium	UG/L	2 / 7	1.5	1.4	1.7
Iron	UG/L	5 / 7	432	34 B	1120
Lead	UG/L	5 / 7	2.7	1.6 B	3.5
Magnesium	UG/L	7 / 7	657	523 B	839
Manganese	UG/L	7 / 7	28.8	3.4 B	85.9
Mercury	UG/L	2 / 7	0.23	0.2 J	0.26
Nickel	UG/L	4 / 7	1	0.67 B	1.5
Potassium	UG/L	6 / 7	378	263 J	417
Silver	UG/L	2 / 7	1	0.99 B	1.1 B
Sodium	UG/L	7 / 7	2390	2020 B	2810
Vanadium	UG/L	2 / 7	1.6	1.6	1.7
Zinc	UG/L	3 / 7	7.7	5.6 B	9.9
MILL POND					
VOCs					
Acetone	UG/L	1 / 4	3	3 JB	3 JB
Methylene Chloride	UG/L	1 / 4	1	1 JB	1 JB
Acetone (low conc.)	UG/L	7 / 13	2.6	2 JB	3 J, JB
Chloromethane (low conc.)	UG/L	1 / 13	0.5	0.5 J	0.5 J
SVOCs					
bis(2-Ethylhexyl)phthalate	UG/L	1 / 18	480	480	480

TABLE 2
SUMMARY OF SURFACE WATER DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
MILL POND (cont.)					
METALS					
Aluminum	UG/L	14 / 21	38.7	30.6 B	64.9 B
Barium	UG/L	1 / 21	1.8	1.8	1.8
Calcium	UG/L	21 / 21	2390	2170 B	2610
Chromium	UG/L	1 / 21	0.6	0.6 B	0.6 B
Copper	UG/L	3 / 21	1.8	0.8 B	3.7 J
Iron	UG/L	13 / 21	31.8	24.1 B	67 B
Lead	UG/L	3 / 21	2.2	1.7 B	2.9 B
Magnesium	UG/L	21 / 21	580	517 B	632
Manganese	UG/L	20 / 21	6.3	3 B	9.6 B
Mercury	UG/L	3 / 21	0.2	0.2 J	0.2 J
Nickel	UG/L	2 / 21	0.72	0.62 B	0.83 B
Potassium	UG/L	20 / 21	313	226 J	364 B
Selenium	UG/L	5 / 21	5.3	3.7 B	10
Sodium	UG/L	21 / 21	2180	1940 B	2550 J
Thallium	UG/L	1 / 21	5.7	5.7 J	5.7 J
Zinc	UG/L	2 / 21	9.2	5.6 B	12.9 B
UPPER DENNY'S RIVER					
VOCs					
Methylene Chloride	UG/L	2 / 3	1	1 JB	1 JB
Acetone	UG/L	1 / 3	3	3 J	3 J
Chloromethane	UG/L	1 / 3	1	1	1
METALS					
Aluminum	UG/L	4 / 8	37.4	32.6 B	45.9
Antimony	UG/L	1 / 8	5.1	5.1 B	5.1 B
Arsenic	UG/L	1 / 8	3	3	3
Barium	UG/L	1 / 8	2.3	2.3	2.3
Calcium	UG/L	8 / 8	2510	2290 B	2780
Iron	UG/L	6 / 8	42.1	26.4 B	85.5
Magnesium	UG/L	8 / 8	583	535 B	628
Manganese	UG/L	8 / 8	5.6	3.1	9 B
Mercury	UG/L	2 / 8	0.2	0.2 J	0.2 J
Nickel	UG/L	1 / 8	0.64	0.64 B	0.64 B
Potassium	UG/L	6 / 8	337	251 J	411 B
Selenium	UG/L	1 / 8	3.9	3.9 B	3.9 B
Sodium	UG/L	8 / 8	2360	2020 B	2820
Zinc	UG/L	2 / 8	3.8	2.2	5.5 B

Notes:

Frequency of detects represents number of positive detects out of total number of non-rejected, analyzed results.
 Statistical summary data for sampling conducted between 1996 through 1999 under Remedial Investigation.

TABLE 3
SUMMARY OF SEDIMENTS DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
Meddybemps Lake - Near Site					
Volatile Organic Compounds					
1,2-Dichloroethene (total)	UG/KG	1 / 2	6	6 J	6 J
Toluene	UG/KG	1 / 2	17	17 J	17 J
Pesticides					
4,4'-DDD	UG/KG	2 / 12	5	4.6 J	6.4
4,4'-DDE	UG/KG	5 / 12	4	3.2	4.6 J
4,4'-DDT	UG/KG	3 / 12	4.9	4.1 J	6 J
DDT, Total	UG/KG	3 / 12	4.9	4.1	6
Dieldrin	UG/KG	1 / 12	10	10 J	10 J
Heptachlor	UG/KG	1 / 12	2.2	2.2 J	2.2 J
Methoxychlor	UG/KG	1 / 12	78	78 J	78 J
PCBs					
Total PCBs (as sum of Homologs)	UG/KG	10 / 12	8	0.06	50.805
Dioxins					
2,3,7,8-TCDD Toxicity Equivalency	NG/KG	4 / 4	0.2	0.07362	0.43255
Metals					
Aluminum	MG/KG	11 / 11	10200	8370	13100
Arsenic	MG/KG	12 / 12	13	2.7	25
Barium	MG/KG	11 / 11	24.2	11.7	38.9
Beryllium	MG/KG	4 / 10	0.44	0.3 BN	0.59
Cadmium	MG/KG	1 / 11	0.097	0.097 B	0.097 B
Calcium	MG/KG	11 / 11	1920	742 N	4680 J
Chromium	MG/KG	12 / 12	31.7	14.9	170
Cobalt	MG/KG	11 / 11	8.6	4.2 J	16.5
Copper	MG/KG	11 / 11	16	6.4	29.1
Iron	MG/KG	11 / 11	17900	11100	25600
Lead	MG/KG	11 / 12	14.8	8.1 J	23.8 J
Magnesium	MG/KG	11 / 11	5140	3260	8110
Manganese	MG/KG	11 / 11	374	160 J	1080
Mercury	MG/KG	3 / 10	0.051	0.041 BN	0.063 BN
Nickel	MG/KG	11 / 11	23.8	14.1	33.3
Potassium	MG/KG	11 / 11	466	216 J	695 J
Selenium	MG/KG	3 / 10	2	1 B	2.7
Silver	MG/KG	4 / 10	1.6	0.72 J	2.3
Sodium	MG/KG	6 / 11	283	50.4 B	513 J
Vanadium	MG/KG	11 / 11	22.5	18.2 J	31.3
Zinc	MG/KG	11 / 11	52.8	27.5	110 J

TABLE 3
SUMMARY OF SEDIMENTS DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
MILL POND					
VOCs					
Tetrachloroethene	UG/KG	1 / 6	310	310	310
SVOCs					
4-Methylphenol	UG/KG	4 / 13	200	92 J	360 J
Acenaphthylene	UG/KG	2 / 13	40	34 J	45 J
Anthracene	UG/KG	2 / 13	100	100 J	100 J
Benzo(a)anthracene	UG/KG	3 / 13	410	28 J	620
Benzo(a)pyrene	UG/KG	2 / 13	600	570	640
Benzo(b)fluoranthene	UG/KG	2 / 13	880	830	900
Benzo(g,h,i)perylene	UG/KG	2 / 13	390	360	420
Benzo(k)fluoranthene	UG/KG	2 / 13	360	290 J	420
bis(2-Ethylhexyl)phthalate	UG/KG	4 / 13	37	30 J	50 J
Carbazole	UG/KG	2 / 13	46	39 J	54 J
Chrysene	UG/KG	3 / 13	480	42 J	720
Fluoranthene	UG/KG	3 / 13	710	39 J	1100
Fluorene	UG/KG	2 / 13	57	51 J	63 J
Indeno(1,2,3-cd)pyrene	UG/KG	2 / 13	340	310	380
Phenanthrene	UG/KG	2 / 13	740	730	750
Pyrene	UG/KG	3 / 13	1100	59 J	1600
Pesticides					
Chlordane, Total	UG/KG	1 / 14	1.6	1.6	1.6
Dieldrin	UG/KG	1 / 14	5.3	5.3 J	5.3 J
Endosulfan II	UG/KG	3 / 14	9.4	3.6 P	18 P
Endosulfan Sulfate	UG/KG	1 / 14	3.1	3.1 P	3.1 P
Endrin	UG/KG	3 / 14	6.3	4.3 P	9 P
Endrin Aldehyde	UG/KG	1 / 14	16	16 P	16 P
gamma-Chlordane	UG/KG	1 / 14	1.6	1.6	1.6
PCBs					
Sum of PCB Homologs	UG/KG	14 / 14	69	0.08783	816.51
Aroclor, Total	UG/KG	3 / 6	260	72	500
Aroclor-1260	UG/KG	3 / 6	330	72	710*P
Dioxins					
Toxicity Equivalency	NG/KG	4 / 4	0.54	0.43495	0.72767

TABLE 3
SUMMARY OF SEDIMENTS DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
MILL POND (cont.)					
Metals					
Aluminum	MG/KG	14 / 14	10100	5980	14200
Arsenic	MG/KG	20 / 20	12.7	4.2 J	29.5 J
Barium	MG/KG	14 / 14	23.7	9.2 B	45.3
Beryllium	MG/KG	5 / 14	0.22	0.15 BN	0.26 BN
Cadmium	MG/KG	2 / 18	0.13	0.13 B	0.13 B
Calcium	MG/KG	14 / 14	2200	983	4070
Chromium	MG/KG	20 / 20	24.6	11.2	44.8 N
Cobalt	MG/KG	11 / 14	8.3	3.7 BN	15.9 N
Copper	MG/KG	11 / 14	12.4	7.9	20.3 N
Iron	MG/KG	14 / 14	18500	8700 J	27400 J
Lead	MG/KG	19 / 20	17.5	6.9	64.9 J
Magnesium	MG/KG	14 / 14	6410	3120 J	17400
Manganese	MG/KG	14 / 14	296	127	698
Mercury	MG/KG	4 / 14	0.045	0.033 BN	0.062 BN
Nickel	MG/KG	14 / 14	25.7	12.2	67 N
Potassium	MG/KG	14 / 14	541	260 B	928 J
Selenium	MG/KG	6 / 14	1.7	0.43 J	2.6
Silver	MG/KG	5 / 14	1.8	0.99 B	2.3
Sodium	MG/KG	7 / 14	170	99.9 B	292 B
Vanadium	MG/KG	14 / 14	20.4	10.6 N	38.4 J
Zinc	MG/KG	14 / 14	49.4	31.8	66.8 N
UPPER DENNY'S RIVER					
VOCs					
1,1,2,2-Tetrachloroethane	UG/KG	1 / 6	5	5 J	5 J
1,2-Dichloroethene (total)	UG/KG	1 / 6	7	7 J	7 J
Toluene	UG/KG	1 / 6	3	3 J	3 J
SVOCs					
Anthracene	UG/KG	2 / 22	38	33 J	44 J
Benzo(a)anthracene	UG/KG	12 / 23	200	110 J	330
Benzo(a)pyrene	UG/KG	14 / 23	190	97 J	360
Benzo(b)fluoranthene	UG/KG	15 / 23	320	80 J	600
Benzo(g,h,i)perylene	UG/KG	4 / 22	220	180 J	240 J
Benzo(k)fluoranthene	UG/KG	11 / 22	240	62 J	610 J
bis(2-Ethylhexyl)phthalate	UG/KG	1 / 22	240	240 J	240 J
Chrysene	UG/KG	13 / 23	230	110 J	440
Fluoranthene	UG/KG	18 / 24	350	70 J	840
Indeno(1,2,3-cd)pyrene	UG/KG	6 / 22	170	78 J	250 J
Phenanthrene	UG/KG	10 / 22	190	85 J	410
Pyrene	UG/KG	18 / 24	310	72 J	820
Total PAH	UG/KG	18 / 21	1400	120	3480

TABLE 3
SUMMARY OF SEDIMENTS DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
UPPER DENNYS RIVER (cont.)					
Pesticides					
Aldrin	UG/KG	1 / 25	0.91	0.91 J	0.91 J
Endosulfan II	UG/KG	3 / 25	3.7	3.3 P	4.3 P
Endrin	UG/KG	1 / 25	3.3	3.3 P	3.3 P
PCBs					
Sum of PCB Homologs	UG/KG	30 / 30	96	0.27321	506.31
Aroclor, Total	UG/KG	7 / 13	140	41	330
Aroclor-1260	UG/KG	7 / 13	140	41 J	330 J
METALS					
Aluminum	MG/KG	30 / 30	10700	6070 J	17600
Antimony	MG/KG	1 / 22	10.7	10.7 J	10.7 J
Arsenic	MG/KG	32 / 32	8.1	2 J	25
Barium	MG/KG	28 / 28	32	11.1 BN	61.7
Beryllium	MG/KG	3 / 22	0.22	0.2 BN	0.24 BN
Cadmium	MG/KG	2 / 25	0.13	0.1 B	0.16
Calcium	MG/KG	30 / 30	2560	900 B	7870 J
Chromium	MG/KG	31 / 31	23.6	14.8	33.5 J
Cobalt	MG/KG	13 / 25	8.5	5.8 J	11.8 B
Copper	MG/KG	22 / 24	14.1	7.8	21.9
Iron	MG/KG	30 / 30	16800	7370 J	26200 J
Lead	MG/KG	33 / 33	24.2	5.9 J	75.7 J
Magnesium	MG/KG	30 / 30	5140	2440 J	10400
Manganese	MG/KG	30 / 30	191	82.8 J	332 J
Mercury	MG/KG	7 / 24	0.12	0.049 BN	0.24 J
Nickel	MG/KG	30 / 30	23.1	8.9 J	47
Potassium	MG/KG	29 / 29	771	328 B	1870
Selenium	MG/KG	5 / 22	1.4	0.78 J	2
Silver	MG/KG	3 / 22	1.7	1.6 BN	1.7 B, BN
Sodium	MG/KG	17 / 25	242	83.2 J	496 J
Thallium	MG/KG	3 / 22	1.2	0.71 B	2.3 B
Vanadium	MG/KG	24 / 25	22.8	13.9 J	37.9 J
Zinc	MG/KG	30 / 30	53.9	21.2 J	114
Dioxins					
Toxicity Equivalency	NG/KG	7 / 7	0.72	0.23567	1.25477

Notes:

Frequency of detects represents number of positive detects out of total number of non-rejected, analyzed results.
Statistical summary data for sampling conducted between 1996 through 1999 under Remedial Investigation and NTCRA.

**TABLE 4
SUMMARY OF NORTHERN PLUME GROUNDWATER DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE**

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
NORTHERN PLUME - OVERBURDEN AQUIFER					
VOCs					
1,2-Dichloroethene (total)	UG/L	5 / 6	14	3 J	26
2-Butanone	UG/L	1 / 8	5	5 J	5 J
Acetone	UG/L	4 / 8	14	1 JB	34
Chloromethane	UG/L	1 / 8	1	1 J	1 J
cis-1,2-Dichloroethene	UG/L	2 / 2	0.75	0.8 J	0.8 J
Methylene Chloride	UG/L	4 / 8	2.1	0.5 JB	4 JB
Tetrachloroethene	UG/L	8 / 8	560	29	2000 *
Trichloroethene	UG/L	8 / 8	6.9	0.5 J	17
SVOCs					
bis(2-Ethylhexyl)phthalate	UG/L	1 / 2	1	1 J	1 J
Butylbenzylphthalate	UG/L	1 / 2	1	1 J	1 J
Di-n-Butylphthalate	UG/L	1 / 2	8	8 J	8 J
PCBs					
Sum of PCB Homologs	NG/L	1 / 1	20	20.09	20.09
METALS					
Aluminum	UG/L	4 / 6	294	21.9 B	767
Arsenic	UG/L	2 / 6	9	8.7 B	9.3 B
Barium	UG/L	3 / 6	7.9	4.1 B	10.7
Calcium	UG/L	6 / 6	6270	4840	7940
Chromium	UG/L	2 / 6	10.2	9.2 B	11.2
Cobalt	UG/L	5 / 6	5.5	3.5 B	8.1
Copper	UG/L	2 / 6	2.9	2.7 B	3 B
Iron	UG/L	5 / 6	796	84.3 B	1160
Lead	UG/L	1 / 6	5.4	5.4	5.4
Magnesium	UG/L	8 / 6	1490	971	1940 B
Manganese	UG/L	6 / 6	852	60.9	1510
Nickel	UG/L	3 / 6	5.7	2.7 B	12.8 B
Potassium	UG/L	4 / 6	1120	803 B	1420 B
Selenium	UG/L	1 / 6	6.1	6.1	6.1
Sodium	UG/L	6 / 6	4340	2810	5900
Zinc	UG/L	2 / 6	31.6	27.8	35.6
NORTHERN PLUME - BEDROCK AQUIFER					
VOCs					
1,1,2,2-Tetrachloroethane	UG/L	3 / 105	47	6.1 J	110 J
1,1,2-Trichloroethane	UG/L	1 / 105	11	11	11
1,1-Dichloroethane	UG/L	1 / 125	9	9 J	9 J
1,1-Dichloroethene	UG/L	2 / 125	1.5	1 J	2 J
1,2,3-Trichlorobenzene	UG/L	1 / 1	0.8	0.8 J	0.8 J
1,2-Dichloroethane	UG/L	1 / 125	3.4	3.4 J	3.4 J
1,2-Dichloroethene (total)	UG/L	34 / 87	45	0.66 J	380 *
1,2-Dichloropropane	UG/L	1 / 105	1.8	1.8 J	1.8 J
2-Butanone	UG/L	2 / 105	44	31 J	58
2-Hexanone	UG/L	2 / 104	38	2 J	71 J
4-Methyl-2-Pentanone	UG/L	5 / 105	11	0.64 J	49 J
Acetone	UG/L	34 / 105	66	1 JB	470 J
Benzene	UG/L	5 / 125	30	0.17 J	96
Bromodichloromethane	UG/L	1 / 105	0.99	0.99 J	0.99 J
Bromoform	UG/L	1 / 105	2.6	2.6 J	2.6 J
Carbon Disulfide	UG/L	2 / 105	3.5	2 J	5 J
Chlorobenzene	UG/L	1 / 125	3.5	3.5 J	3.5 J

TABLE 4
SUMMARY OF NORTHERN PLUME GROUNDWATER DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
NORTHERN PLUME - BEDROCK AQUIFER					
VOCs (cont.)					
Chloroform	UG/L	6 / 105	0.69	0.085 J	3 J
Chloromethane	UG/L	1 / 105	0.091	0.091 J	0.091 J
cis-1,2-Dichloroethene	UG/L	8 / 37	7	1 J	18 J
cis-1,3-Dichloropropene	UG/L	1 / 105	2.2	2.2 J	2.2 J
Dibromochloromethane	UG/L	1 / 105	6.9	6.9 J	6.9 J
Ethylbenzene	UG/L	8 / 125	6.9	0.05 J	34 J
Methyl tert-Butyl Ether	UG/L	1 / 18	1	1 J	1 J
Methylene Chloride	UG/L	28 / 125	36	0.11 J	440
Tetrachloroethene	UG/L	115 / 125	1200	0.4 J	12000
Toluene	UG/L	46 / 125	40	0.075 J	330
Total Xylenes	UG/L	6 / 125	55	1 J, JB	140
trans-1,3-Dichloropropene	UG/L	1 / 105	1.9	1.9 J	1.9 J
Trichloroethene	UG/L	62 / 124	25	0.18 J	360
Vinyl Chloride	UG/L	1 / 110	0.9	0.9 J	0.9 J
SVOCs					
2,4-Dinitrotoluene	UG/L	1 / 18	7	7 J	7 J
bis(2-Ethylhexyl)phthalate	UG/L	5 / 18	3	1 J	6 J
Butylbenzylphthalate	UG/L	2 / 18	2	2 J	2 J
Di-n-Butylphthalate	UG/L	1 / 18	3	3 J	3 J
PCBs					
Sum of PCB Homologs	NG/L	1 / 10	7.6	7.6	7.6
PEST					
Aldrin	UG/L	1 / 8	0.0024	0.0024 J	0.0024 J
METALS					
Aluminum	UG/L	62 / 56	642	6.3 B	11600
Antimony	UG/L	5 / 55	8.2	1.6 B	30
Arsenic	UG/L	17 / 56	5.6	2.4 B	12.7
Barium	UG/L	41 / 55	24.6	1.4 J	226
Beryllium	UG/L	9 / 55	0.36	0.24 B	0.72 B
Cadmium	UG/L	6 / 55	1	0.33 B	1.6
Calcium	UG/L	56 / 56	15200	4660 B	40500
Chromium	UG/L	32 / 55	7	0.75 B	61.3
Cobalt	UG/L	37 / 56	4.7	0.59 B	16.3
Copper	UG/L	38 / 55	4.6	0.95 B	34
Iron	UG/L	89 / 92	3630	4 B	67800 N
Lead	UG/L	32 / 56	5	1	10.7
Magnesium	UG/L	56 / 56	3660	1360 B	7210
Manganese	UG/L	92 / 92	430	1.6 B	2620 J
Mercury	UG/L	8 / 55	0.1	0.1 B, BN	0.11 B
Nickel	UG/L	50 / 55	8.5	0.83 B	66.5
Potassium	UG/L	55 / 56	1140	315 B	5640
Selenium	UG/L	3 / 55	4.1	2.6 B	6.4
Silver	UG/L	3 / 55	0.66	0.62 B	1.3 B
Sodium	UG/L	56 / 56	6040	3250 B	30600
Vanadium	UG/L	19 / 55	2.3	0.61 B	7.1 B
Zinc	UG/L	46 / 56	229	1.3 B	2230

Notes:

- Frequency of detects represent number of positive detects out of total number of non-rejected, analyzed results.
- Statistical summary data for sampling conducted between 1996 through 2000 under Remedial Investigation and NTCRA.

TABLE 5
SUMMARY OF SOUTHERN PLUME GROUNDWATER DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
SOUTHERN PLUME - OVERBURDEN AQUIFER					
VOCs					
Acetone	UG/L	13 / 35	18	3 J	46
Methylene Chloride	UG/L	6 / 35	6.2	1 J	26 J
Tetrachloroethene	UG/L	35 / 35	390	4	1100
Toluene	UG/L	4 / 35	29	1 J	110
Total Xylenes	UG/L	1 / 35	3	3 J	3 J
Trichloroethene	UG/L	5 / 35	0.54	0.4 J	1
SVOCs					
1,2,4-Trichlorobenzene	UG/L	6 / 16	8.7	5 J	16
bis(2-Ethylhexyl)phthalate	UG/L	6 / 15	50	1 J	190
Di-n-Butylphthalate	UG/L	5 / 15	3.6	0.9 J	8 J
PCBs					
Sum of PCB Homologs	NG/L	9 / 11	1500	0.22	4120.6
Pest					
4,4'-DDT	UG/L	1 / 3	0.0051	0.0051 J	0.0051 J
DDT, Total	UG/L	1 / 3	0.0051	0.0051	0.0051
METALS					
Aluminum	UG/L	13 / 27	1810	10.7 B	20100
Arsenic	UG/L	5 / 27	4.4	0.8	12.3
Barium	UG/L	23 / 27	10.8	2.3	103
Beryllium	UG/L	1 / 27	0.15	0.15 B	0.15 B
Cadmium	UG/L	7 / 27	3.5	0.43 B	15.6
Calcium	UG/L	25 / 27	10300	6830	20400 J
Chromium	UG/L	12 / 27	20	1.1	91.8
Cobalt	UG/L	15 / 27	20.8	0.65 B	77.7
Copper	UG/L	15 / 27	10.1	0.88 B	41.8
Iron	UG/L	20 / 27	1980	16.8 B	28900 J
Lead	UG/L	8 / 27	18.2	5	90
Magnesium	UG/L	26 / 27	3620	1820 B	22700
Manganese	UG/L	27 / 27	97.1	5.1 B	787 J
Nickel	UG/L	21 / 27	20.8	1.9 B	86.4
Potassium	UG/L	22 / 27	1380	658 B	3100
Silver	UG/L	1 / 27	1.4	1.4	1.4
Sodium	UG/L	26 / 27	4660	2100 B	11600
Thallium	UG/L	1 / 27	3.8	3.8 B	3.8 B
Vanadium	UG/L	4 / 27	8.2	1 B	28.8
Zinc	UG/L	19 / 27	512	3.3 B	7680
SOUTHERN PLUME - BEDROCK AQUIFER					
VOCs					
1,1,1-Trichloroethane	UG/L	19 / 64	8	0.3 J	100 J
1,1-Dichloroethane	UG/L	9 / 64	2.5	0.6 J	4 J
1,1-Dichloroethene	UG/L	7 / 64	1.7	0.8 J	3 J
1,2,3-Trichlorobenzene	UG/L	1 / 14	0.6	0.6 J	0.6 J
1,2-Dichloroethene (total)	UG/L	1 / 20	1	1 J	1 J

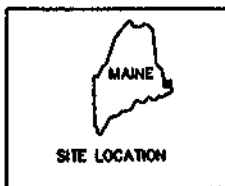
TABLE 5
SUMMARY OF SOUTHERN PLUME GROUNDWATER DATA
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
SOUTHERN PLUME - BEDROCK AQUIFER					
VOCs (cont.)					
4-Methyl-2-Pentanone	UG/L	6 / 64	4.5	1 J	16
Acetone	UG/L	21 / 64	14	3 JB	120
Bromomethane	UG/L	1 / 64	4	4 JB	4 JB
cis-1,3-Dichloropropene	UG/L	1 / 64	0.3	0.3 J	0.3 J
Ethyl Ether	UG/L	2 / 11	0.55	0.5 J	0.6 J
Ethylbenzene	UG/L	1 / 64	2	2 J	2 J
Methylene Chloride	UG/L	13 / 64	3	0.5 J, JB	8 B
Tetrachloroethene	UG/L	63 / 64	130	0.8 J, JB	460 *
Toluene	UG/L	22 / 64	39	0.5 J	650 J
Total Xylenes	UG/L	1 / 61	0.4	0.4 JB	0.4 JB
Trichloroethene	UG/L	29 / 64	7.8	0.6 J	100 J
SVOCs					
1,2,4-Trichlorobenzene	UG/L	1 / 18	0.7	0.7 J	0.7 J
Butylbenzylphthalate	UG/L	1 / 15	5	5 J	5 J
Di-n-Butylphthalate	UG/L	2 / 15	6	6 J	6 J
Di-n-octylphthalate	UG/L	1 / 15	2	2 J	2 J
Phenol	UG/L	1 / 15	5	5 J	5 J
Pest					
Aldrin	UG/L	1 / 3	0.00092	0.00092 J	0.00092 J
METALS					
Aluminum	UG/L	20 / 33	1560	20.9 B	14100
Antimony	UG/L	1 / 33	2.3	2.3 B	2.3 B
Arsenic	UG/L	12 / 33	7.5	3 B	16.5
Barium	UG/L	18 / 33	7.7	1.5	50.6
Beryllium	UG/L	4 / 33	0.55	0.11 B	1.4
Cadmium	UG/L	6 / 33	1	0.63 B	1.6 J
Calcium	UG/L	33 / 33	11600	2780 B	26200
Chromium	UG/L	17 / 33	7.3	0.56 B	34.4
Cobalt	UG/L	14 / 33	5.9	0.82 B	20.6
Copper	UG/L	18 / 33	9.3	1 B	48.1
Iron	UG/L	31 / 33	2310	15 B	13700 J
Lead	UG/L	15 / 33	7.9	1.2 J	23.1
Magnesium	UG/L	33 / 33	6000	639 B	21900
Manganese	UG/L	32 / 33	57	0.6 B	277 J
Nickel	UG/L	16 / 33	12.1	0.76 B	55.5
Potassium	UG/L	29 / 33	1600	1200	2540 B
Selenium	UG/L	5 / 33	4.2	2.2 B	7.7
Silver	UG/L	4 / 33	3	0.66 B	7.2 B
Sodium	UG/L	33 / 33	14400	1870	36800
Thallium	UG/L	1 / 33	4	4 B	4 B
Vanadium	UG/L	13 / 33	3.1	0.76 B	9.9
Zinc	UG/L	20 / 33	659	3 B	4250

Notes:

1. Frequency of detects represent number of positive detects out of total number of non-rejected, analyzed results.
2. Statistical summary data for sampling conducted between 1996 through 2000 under RI and NTCRA.

ACADE: 1/26/78/12/13/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100



GRAPHIC SCALE
0' 10'
1 INCH = 120 FEET

Meddybemps Lake

EASTERN
SURPLUS
COMPANY
SUPERFUND
SITE

Mill Pond
(Dennis River)

Stone Road

Route 181

FIGURE 1
SITE LOCATION MAP
EASTERN SURPLUS COMPANY - NPL SIT

Legend



AREAS OF EXCAVATION

1st Stone Foundation (Oldway)
(See Plan Reference No. 2)

Meddybemps Lake

Remnant Rock Pile

Concrete Fish Way

SMITH WELL

GRAPHIC SCALE
0' 100'
1 INCH = 100 FEET

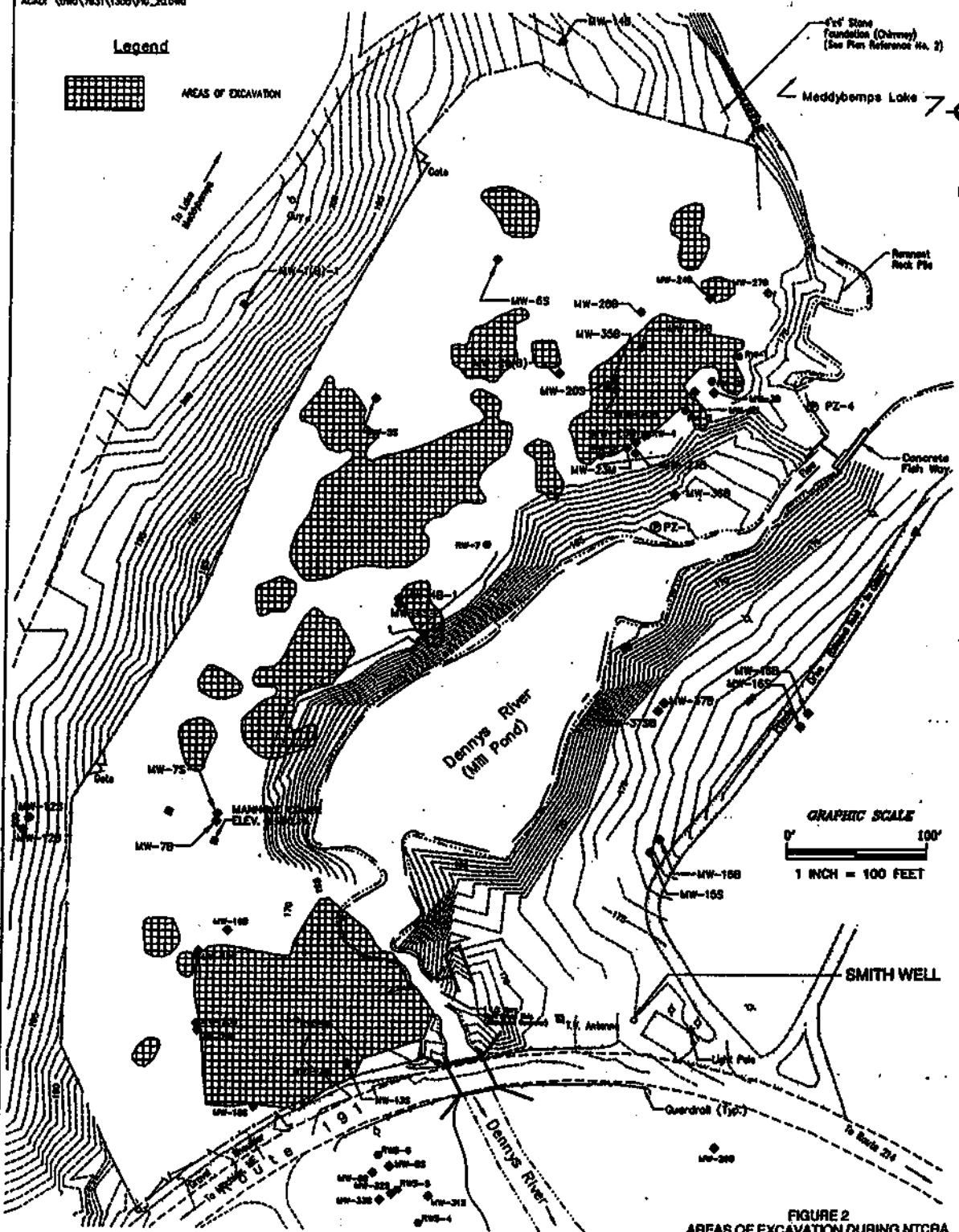
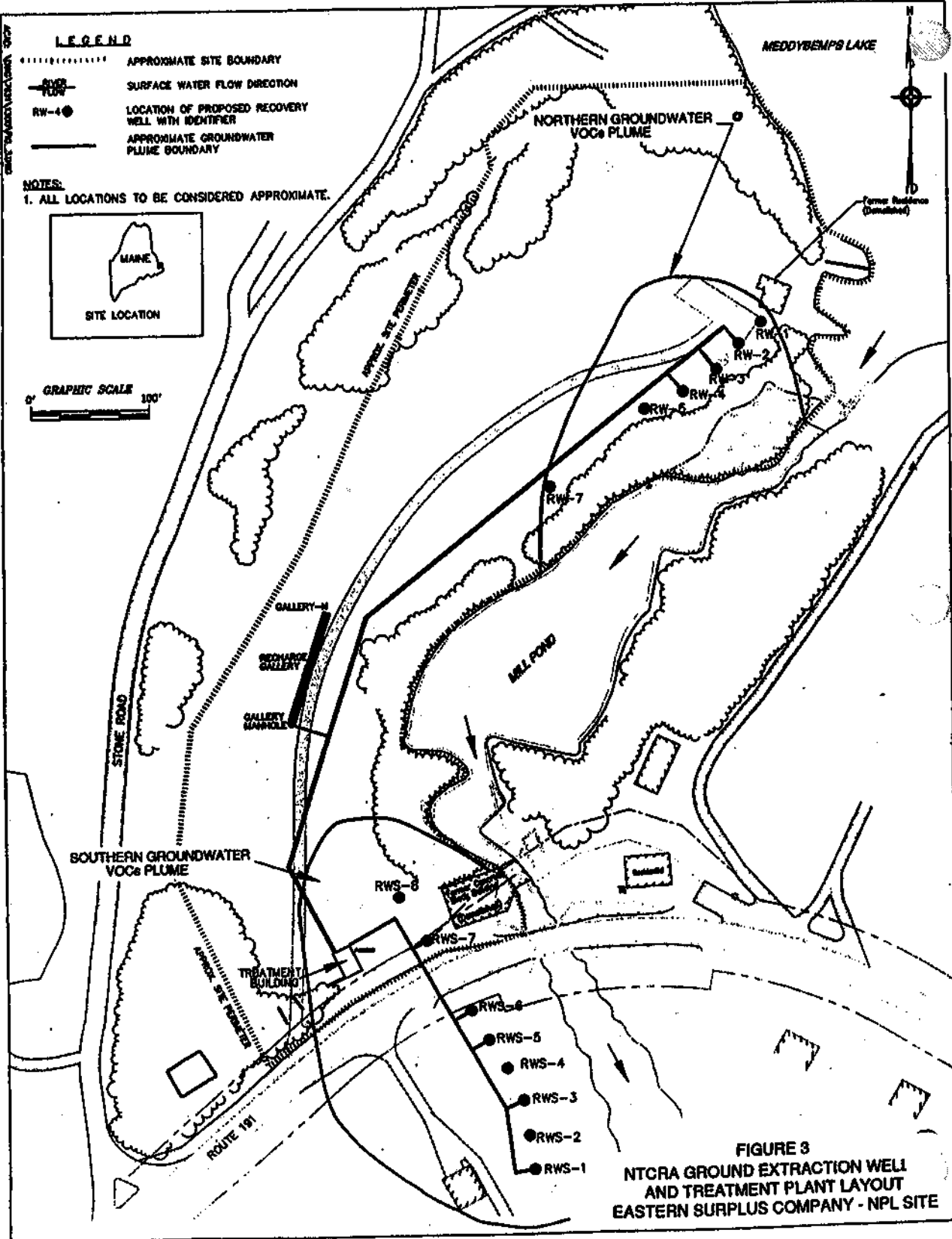
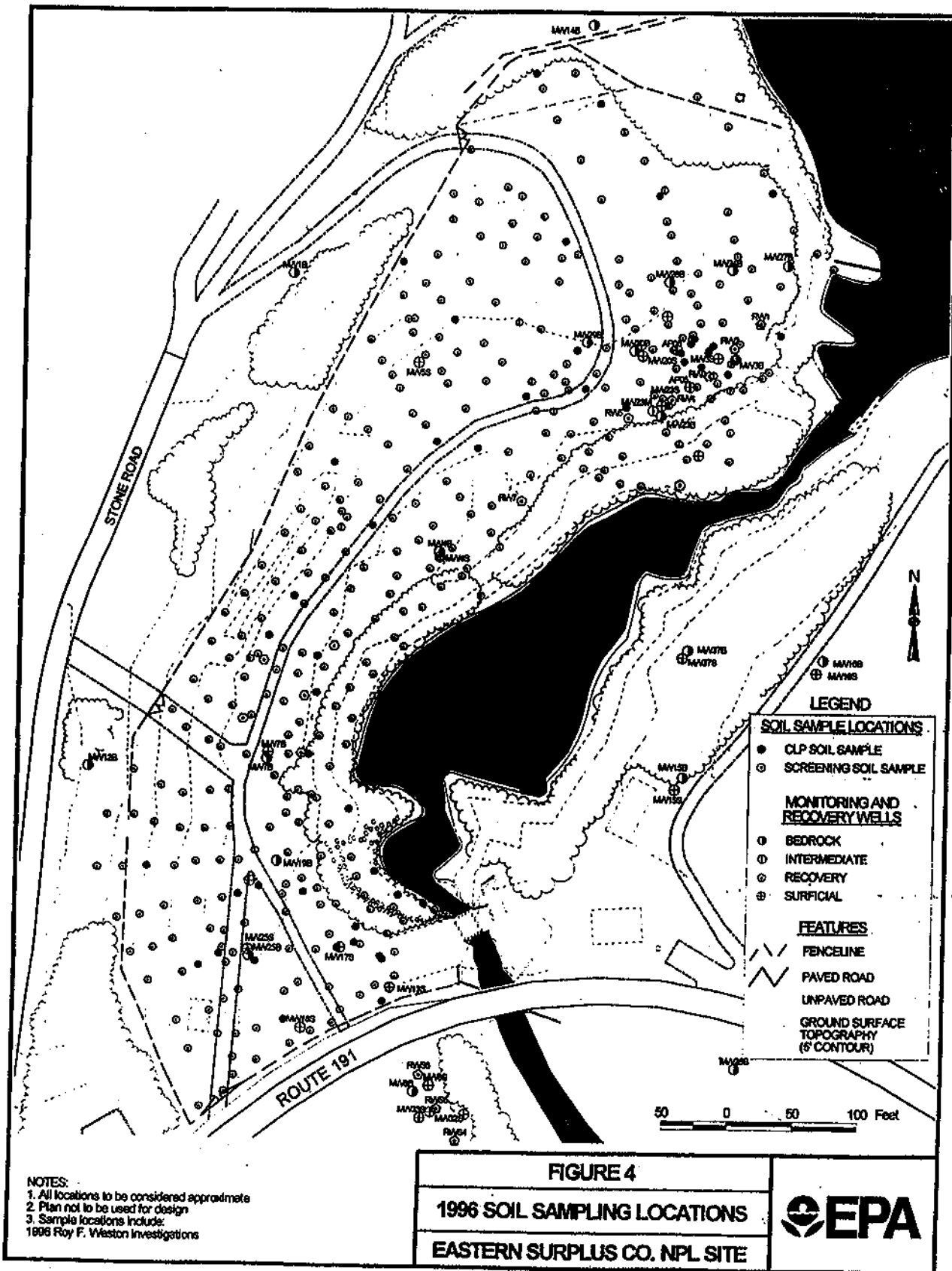
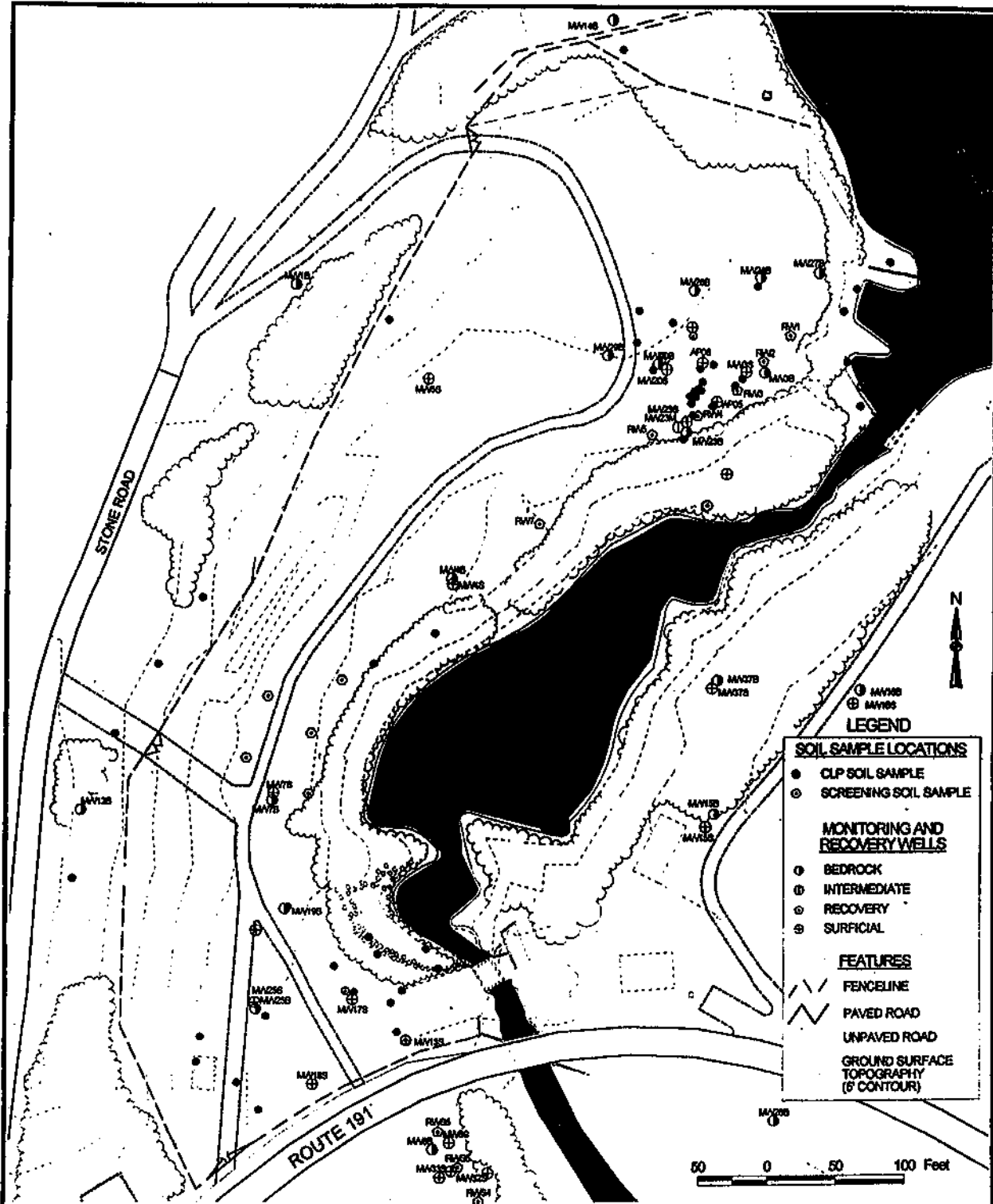


FIGURE 2
AREAS OF EXCAVATION DURING NTCRA
EASTERN SURPLUS COMPANY - NPL SITE







NOTES:

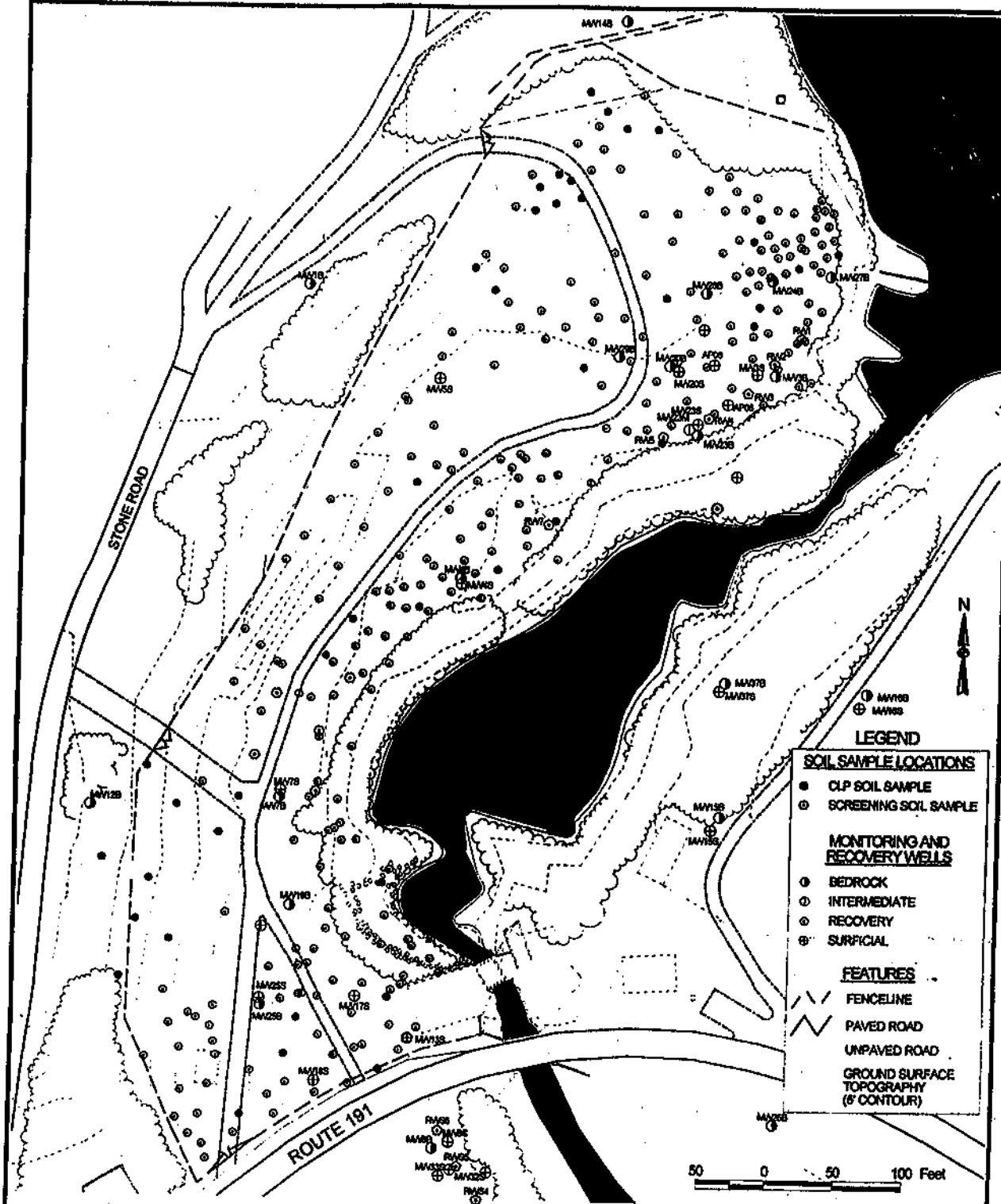
1. All locations to be considered approximate
2. Plan not to be used for design
3. Sample locations include:
1997 Roy F. Weston and Brown & Root investigations

FIGURE 5

1997 SOIL SAMPLING LOCATIONS

EASTERN SURPLUS CO. NPL SITE

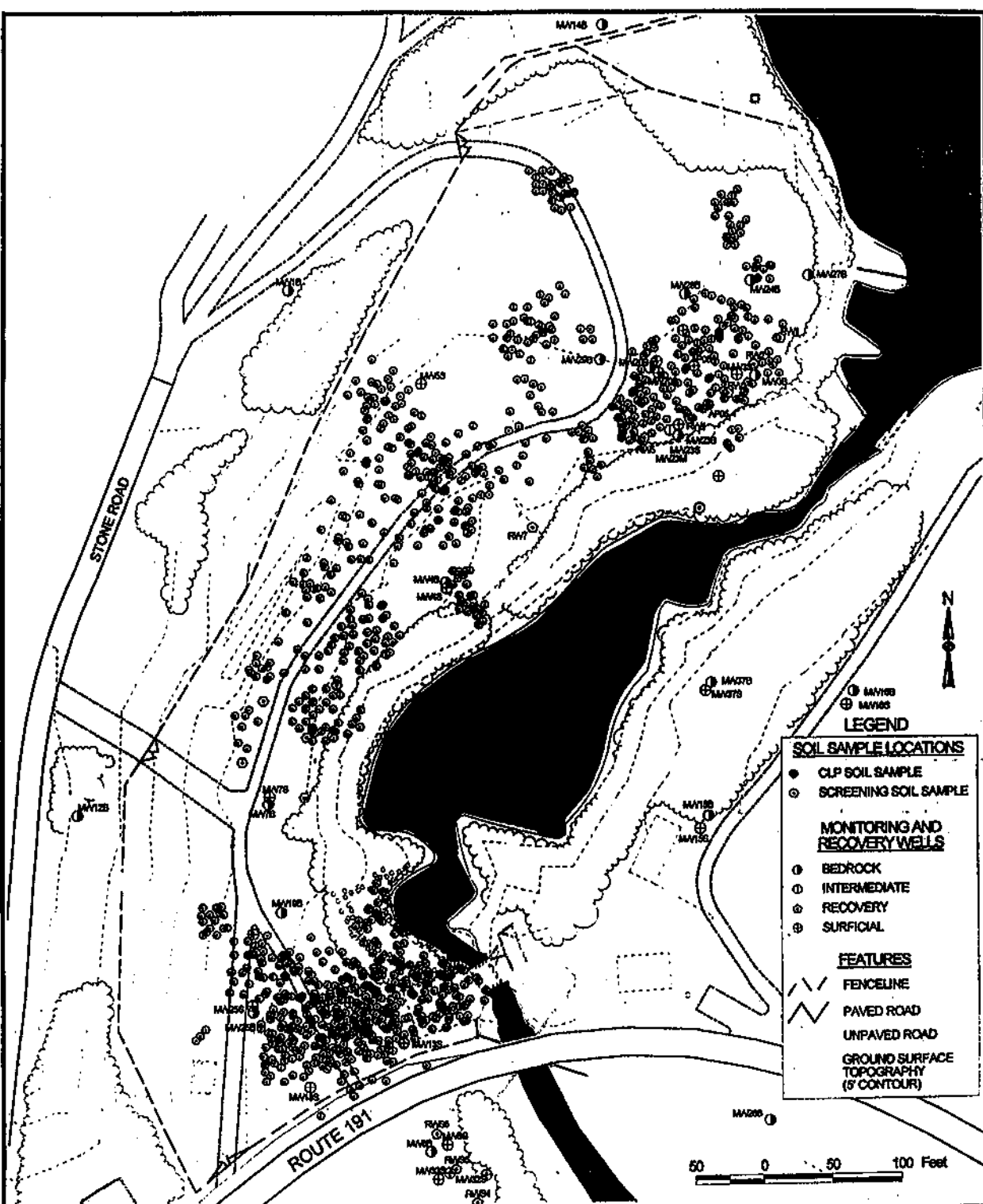


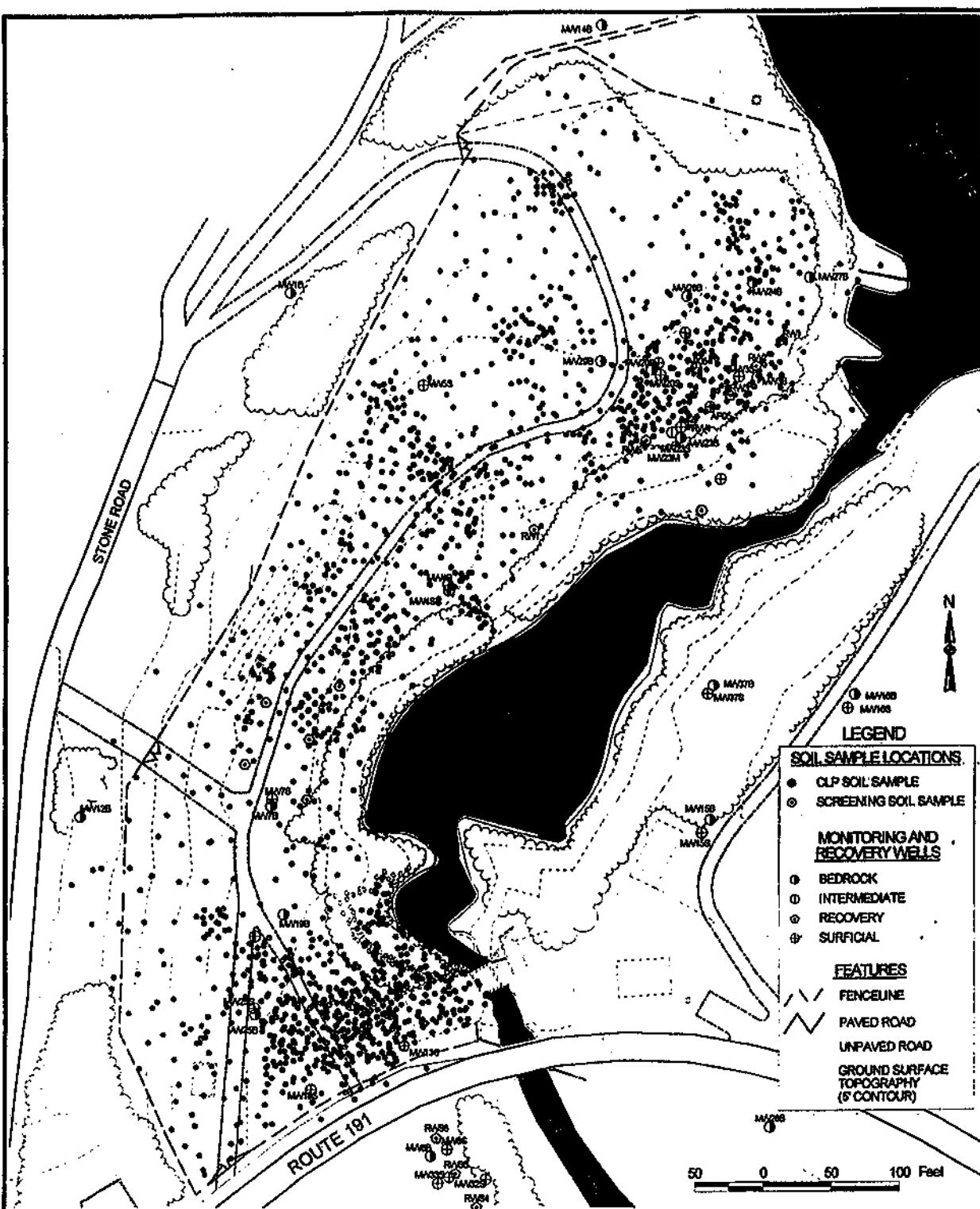


NOTES:
 1. All locations to be considered approximate
 2. Plan not to be used for design
 3. Sample locations include:
 1998 Tetra Tech NUS Investigations

FIGURE 6
1998 SOIL SAMPLING LOCATIONS
EASTERN SURPLUS CO. NPL SITE







NOTES:
 1. All locations to be considered approximate
 2. Plan not to be used for design
 3. Sample locations include:
 1996 - 1997 Roy F. Weston, 1997 Brown & Root,
 and 1998-1999 Tetra Tech NUS Investigations

FIGURE 8
1996-1999 SOIL SAMPLING LOCATIONS
EASTERN SURPLUS CO. NPL SITE



LEGEND

- APPROXIMATE SITE BOUNDARY
- SD-105 SEDIMENT STATION
- ▲ SW-101 SURFACE WATER STATION
- {0.35} PCBs IN SEDIMENTS ($\mu\text{g}/\text{kg}$)
- * PCBs > 70 $\mu\text{g}/\text{kg}$ LEL
- PCBs > 2000 $\mu\text{g}/\text{kg}$

NOTES:

1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.

GRAPHIC SCALE

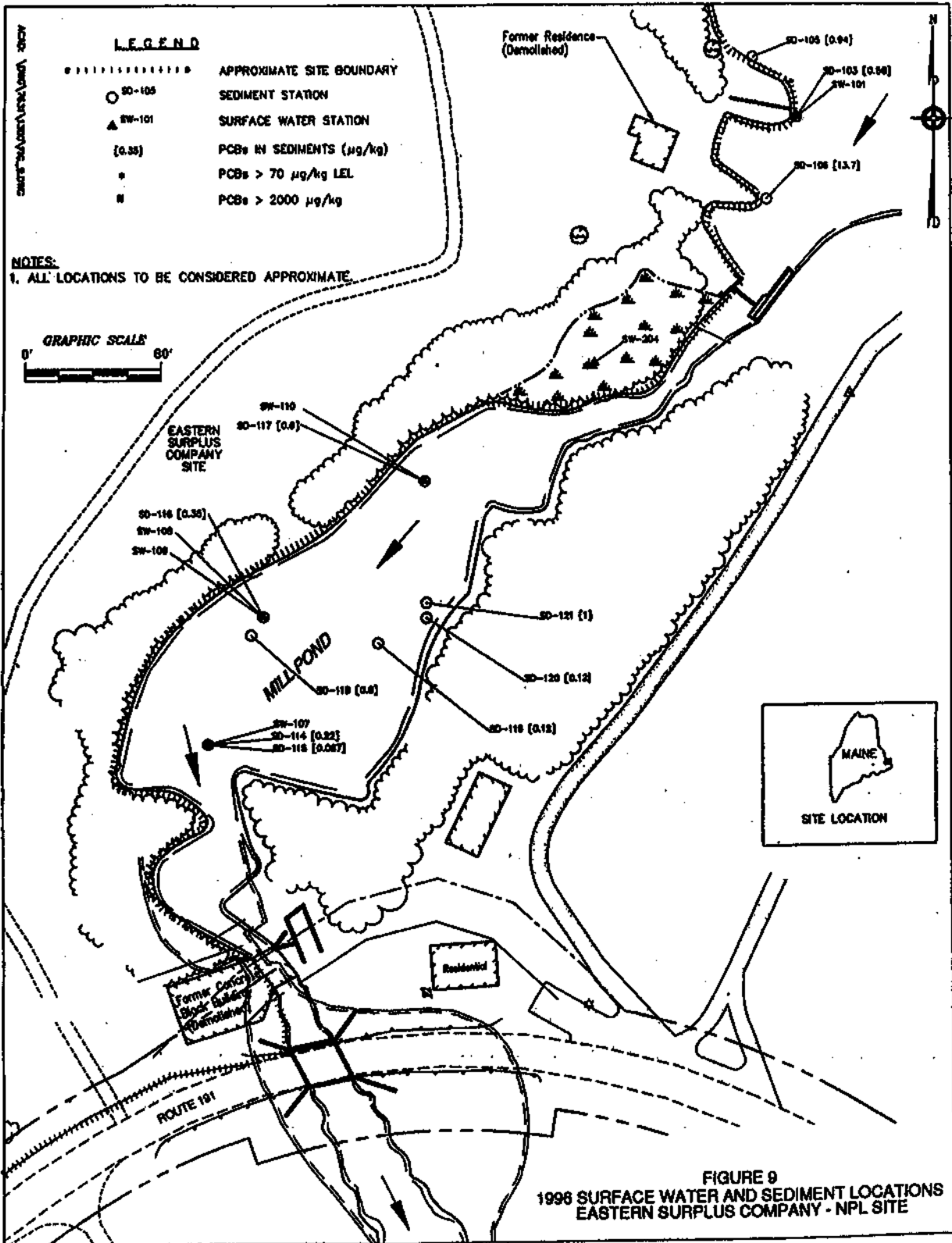
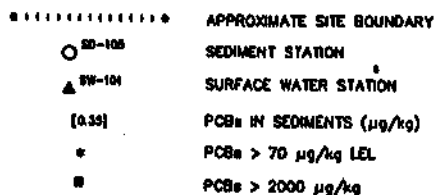


FIGURE 9
1996 SURFACE WATER AND SEDIMENT LOCATIONS
EASTERN SURPLUS COMPANY - NPL SITE

LEGEND



NOTES:

1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.

GRAPHIC SCALE



**EASTERN
SURPLUS
COMPANY
SITE**

MILL POND

Former Conference
Block Building
Abolished

Background:

ROUTE 191

50-117



SITE LOCATION

FIGURE 10
1997 SURFACE WATER AND SEDIMENT LOCATIONS
EASTERN SURPLUS COMPANY - NPL SITE

LEGEND

- APPROXIMATE SITE BOUNDARY
- SD-105 SEDIMENT STATION
- ▲ SW-101 SURFACE WATER STATION
- [0.35] PCBs IN SEDIMENTS ($\mu\text{g}/\text{kg}$)
- PCBs > 70 $\mu\text{g}/\text{kg}$ LEL
- PCBs > 2000 $\mu\text{g}/\text{kg}$

NOTES:

1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.

GRAPHIC SCALE



EASTERN
SURPLUS
COMPANY
SITE

MILL POND

Former Residence
(Demolished)

SW-205

SD-308 [0.8]

SW-203

SW-DUPL-04

SW-202

SD-304 [2900]

SD-303 [7900]

Former Control
Room Building
(Demolished)

Residential

ROUTE 191

SW-201

SD-301 [75]

SD-207 [230]

SD-DUPL-01 [438]

SW-206

MAINE

SITE LOCATION

FIGURE 11

1998 SURFACE WATER AND SEDIMENT LOCATIONS
EASTERN SURPLUS COMPANY - NPL SITE

LEGEND

- APPROXIMATE SITE BOUNDARY
- SD-105 SEDIMENT STATION
- ▲ SW-101 SURFACE WATER STATION
- {0.35} PCBs IN SEDIMENTS ($\mu\text{g}/\text{kg}$)
- * PCBs > 70 $\mu\text{g}/\text{kg}$ LEL
- ⊛ PCBs > 2000 $\mu\text{g}/\text{kg}$

NOTES:

1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.



EASTERN
SURPLUS
COMPANY
SITE

MILL POND

ROUTE 191

Former Residence
(Demolished)

Former Conner
Block Building
(Demolished)

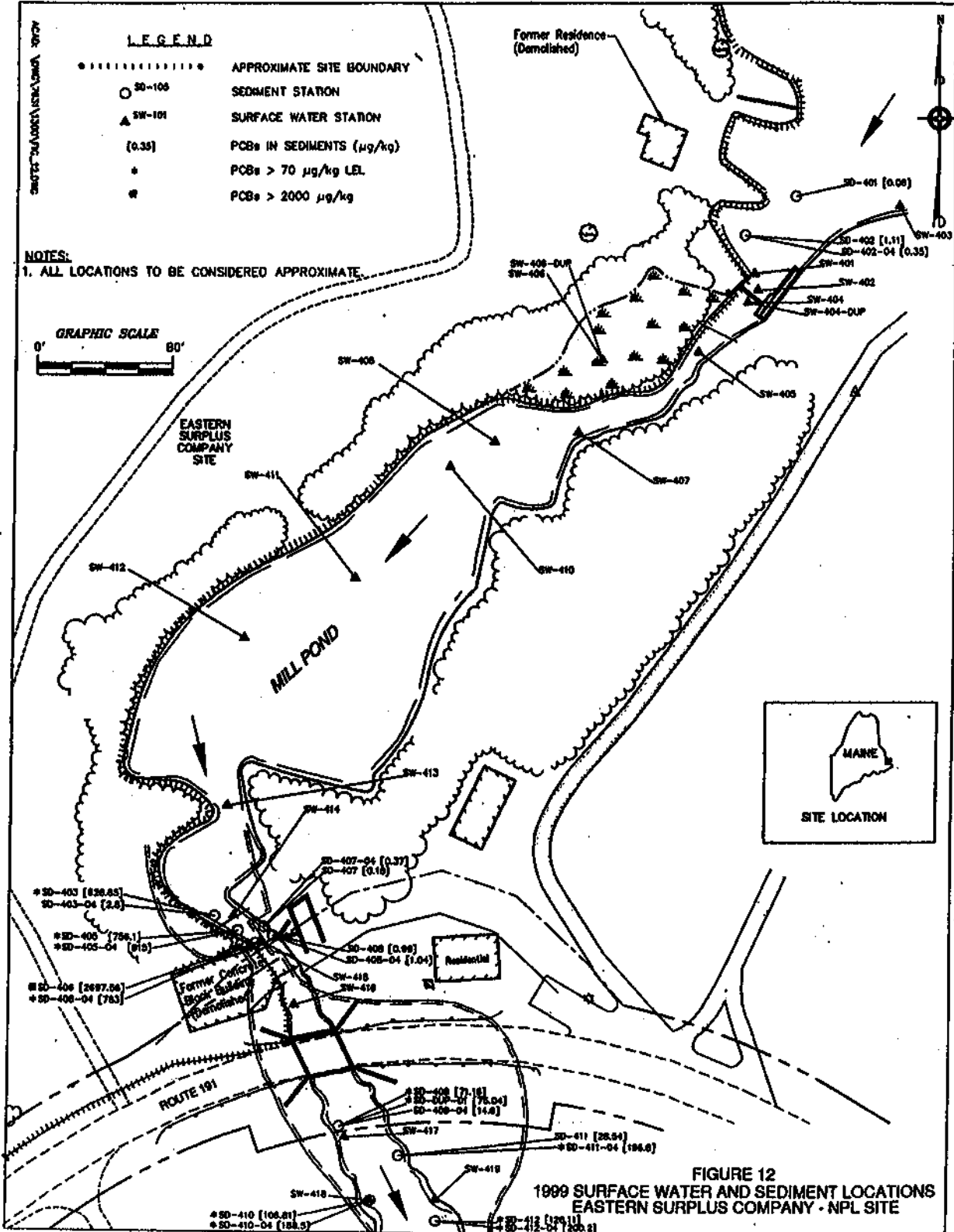
Residential

MAINE

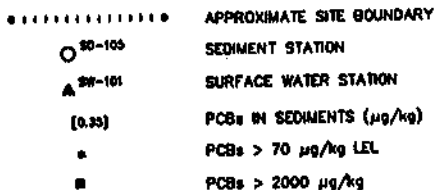
SITE LOCATION

FIGURE 12

1999 SURFACE WATER AND SEDIMENT LOCATIONS
EASTERN SURPLUS COMPANY - NPL SITE



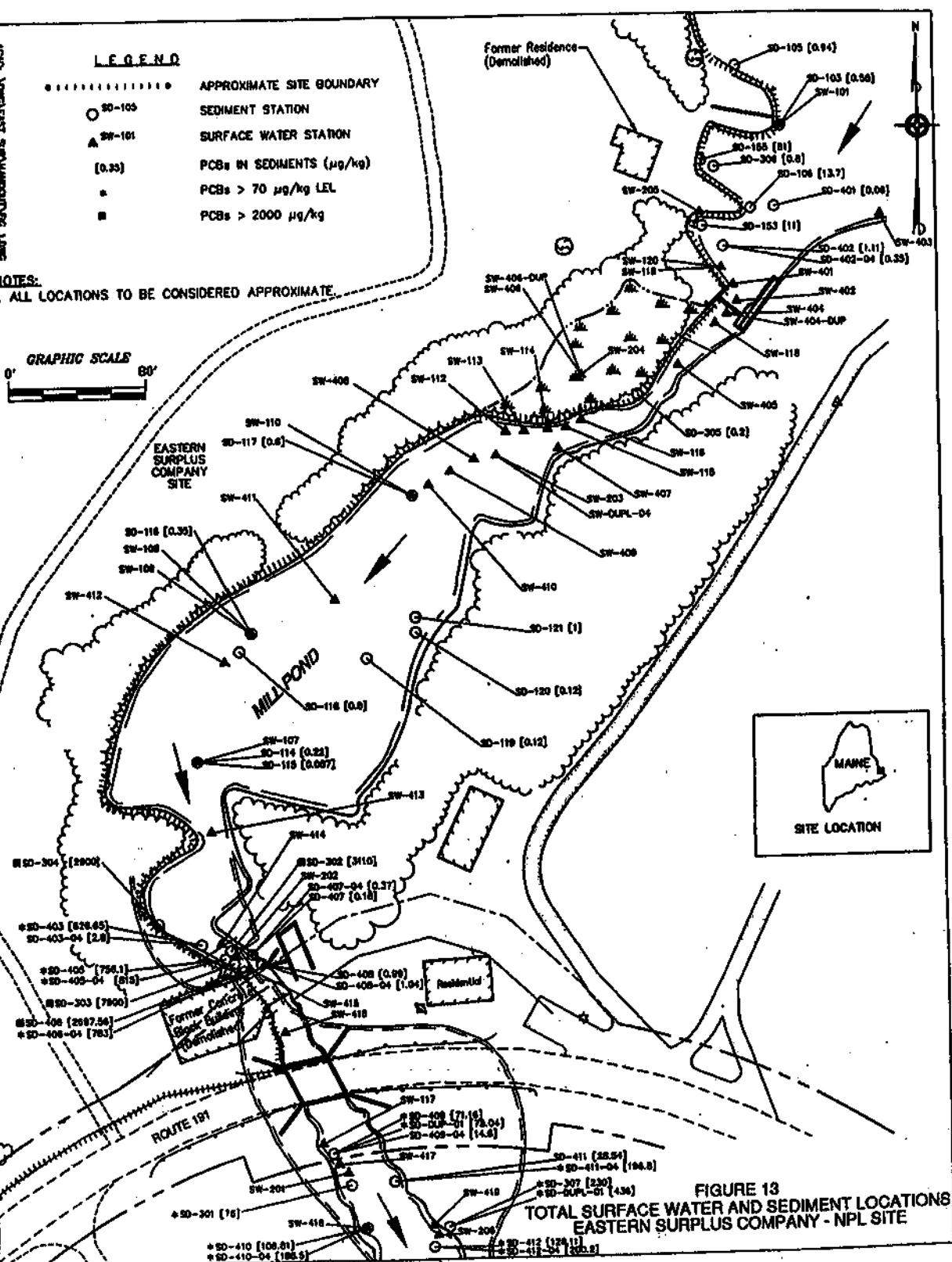
LEGEND



NOTES:

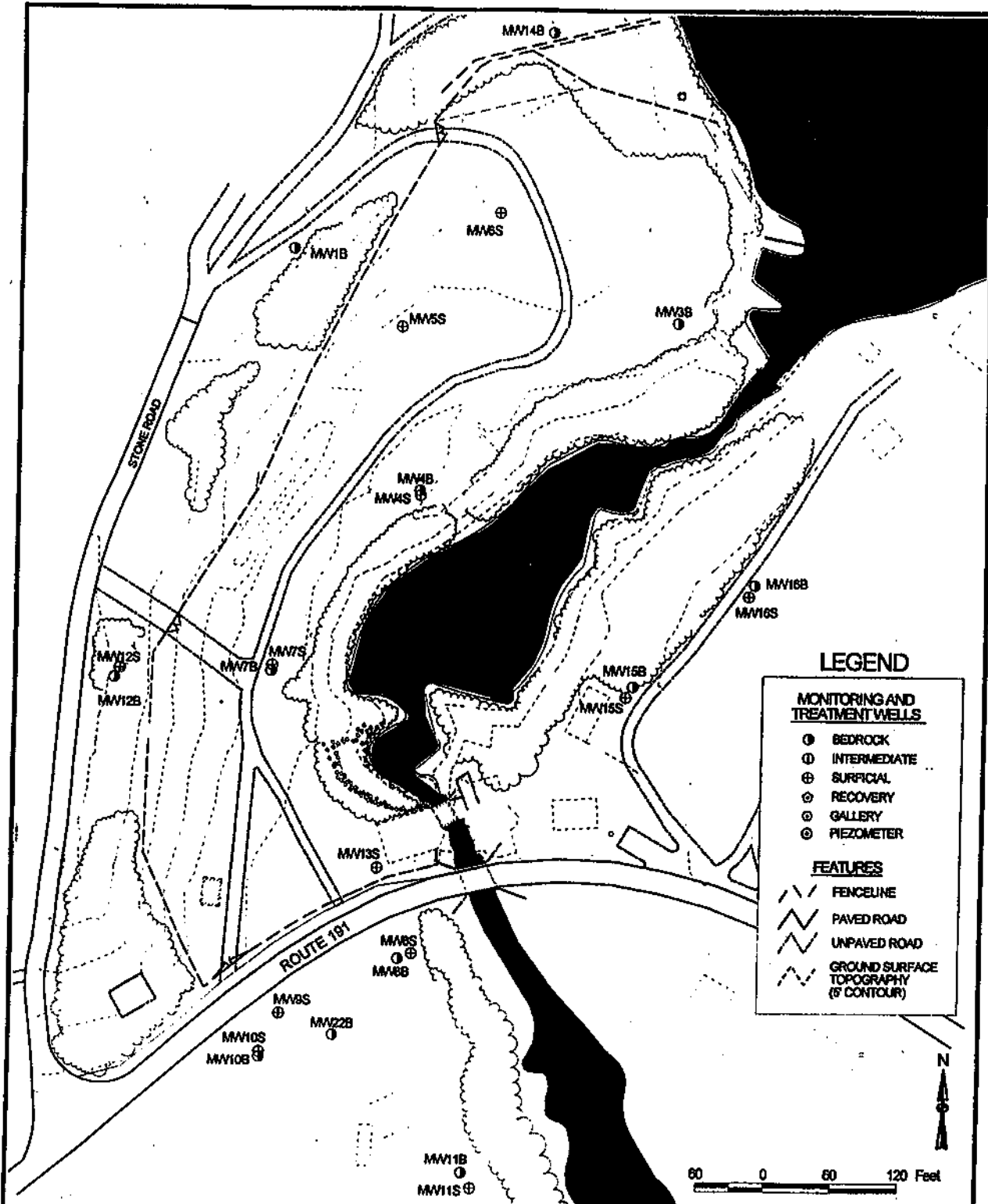
NOTES:
1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.

GRAPHIC SCALES



* 50-307 (230)
 * 50-501-51 (436)

FIGURE 13
 TOTAL SURFACE WATER AND SEDIMENT LOCATIONS
 EASTERN SURPLUS COMPANY - NPL SITE



NOTES:

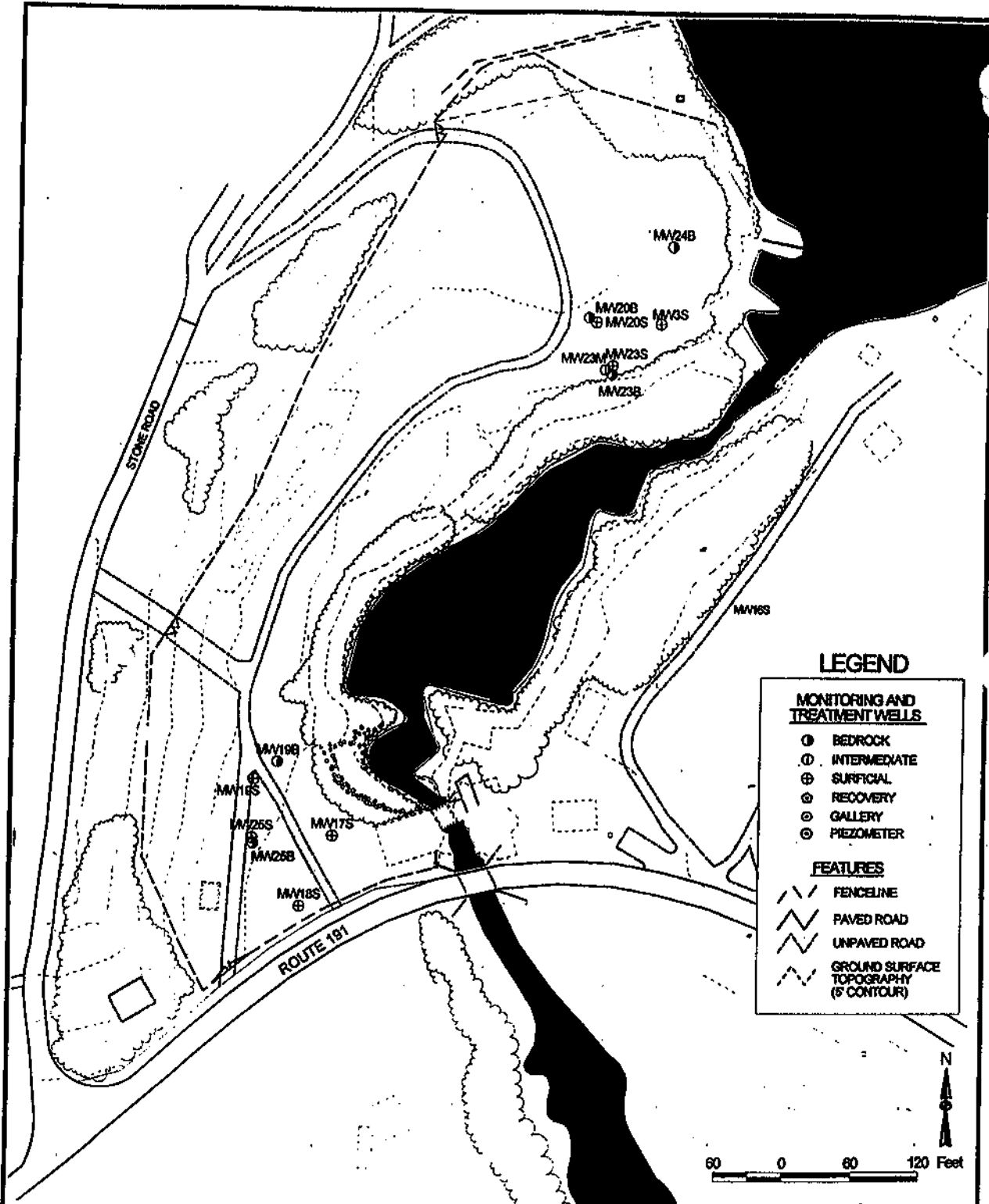
1. All locations to be considered approximate
2. Plan not to be used for design
3. Well locations include those installed prior to and including 1996 investigations.

FIGURE 14

1996 WELL LOCATIONS

EASTERN SURPLUS CO. NPL SITE





NOTES:

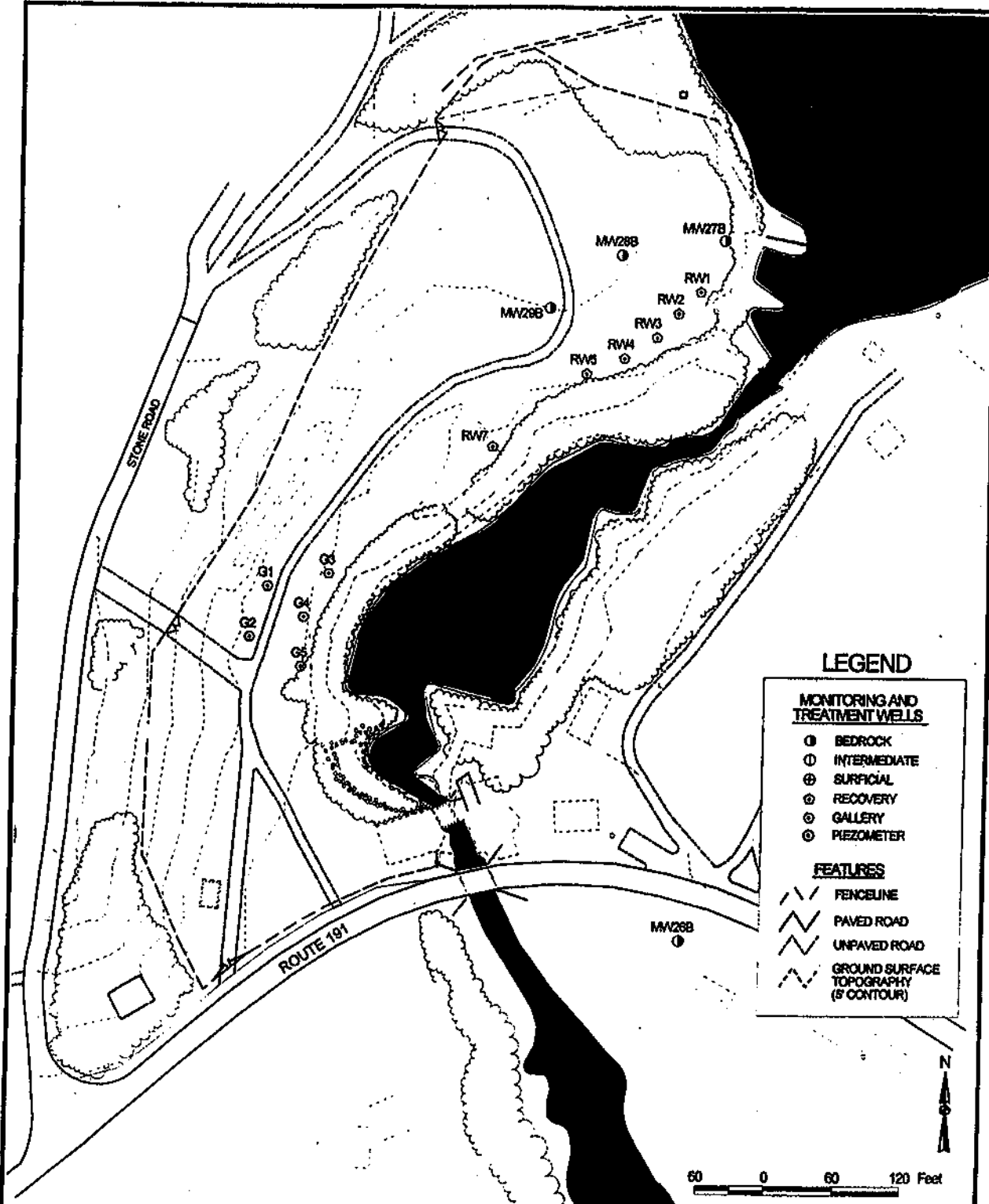
1. All locations to be considered approximate
2. Plan not to be used for design
3. Well locations include those installed during and 1997 investigations.

FIGURE 15

1997 WELL LOCATIONS

EASTERN SURPLUS CO. NPL SITE





LEGEND

MONITORING AND TREATMENT WELLS

- ⊙ BEDROCK
- ① INTERMEDIATE
- ⊕ SURFICIAL
- ⊗ RECOVERY
- ⊙ GALLERY
- ⊙ PIEZOMETER

FEATURES

- FENCELINE
- == PAVED ROAD
- - - UNPAVED ROAD
- ~ GROUND SURFACE TOPOGRAPHY (5' CONTOUR)

NOTES:
 1. All locations to be considered approximate
 2. Plan not to be used for design
 3. Well locations include those installed during 1998 investigations.

FIGURE 16

1998 WELL LOCATIONS

EASTERN SURPLUS CO. NPL SITE



60 0 60 120 Feet

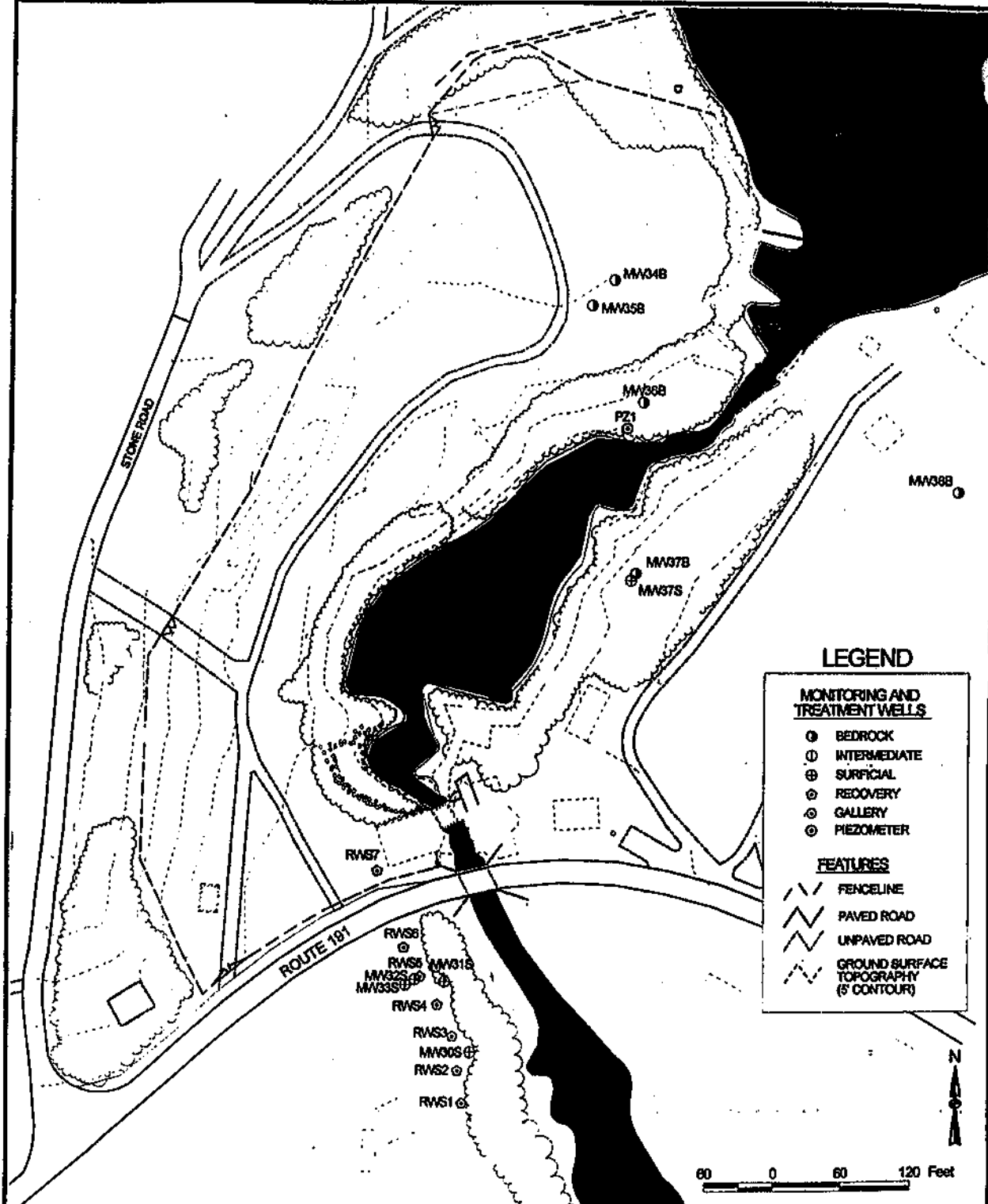
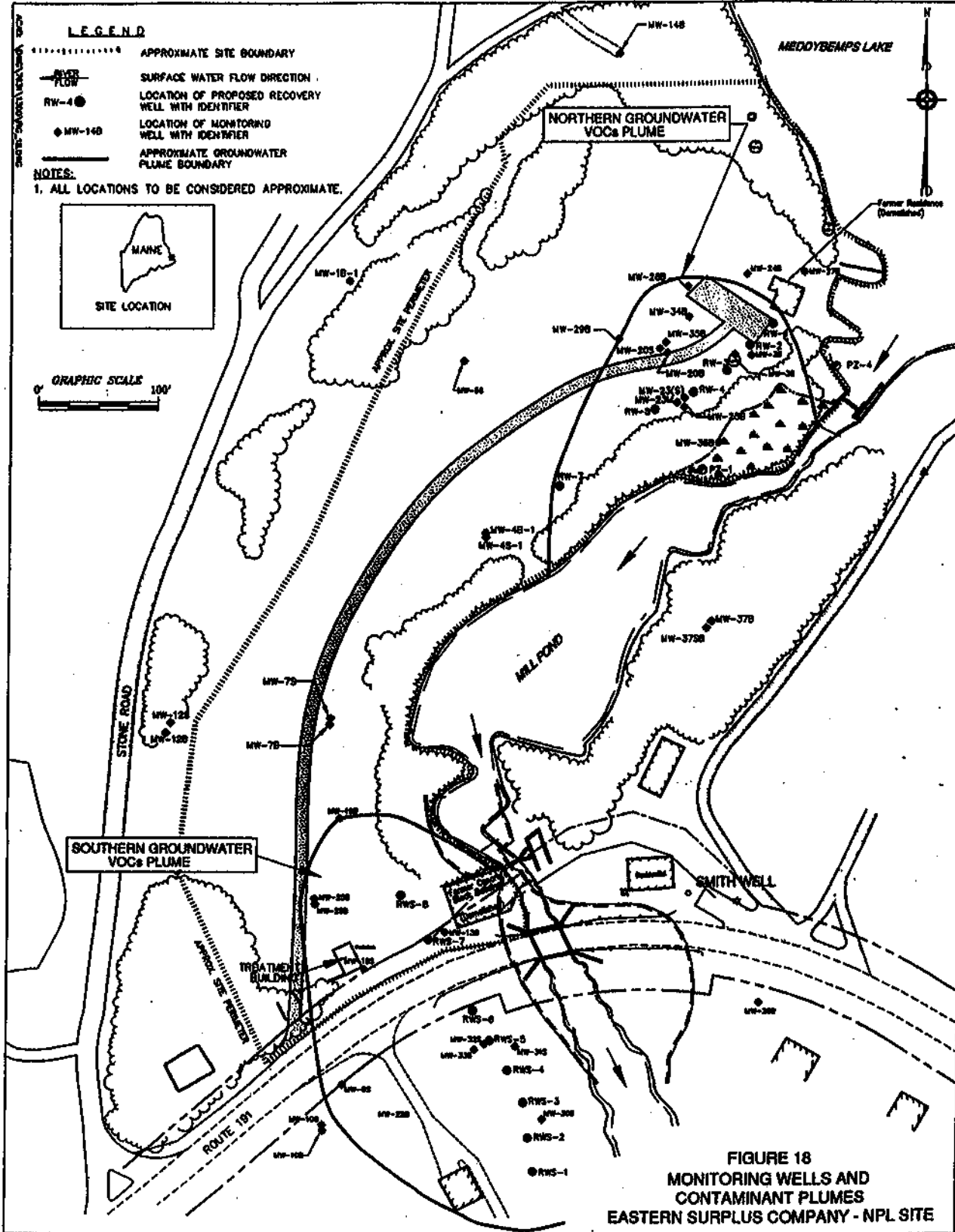


FIGURE 17

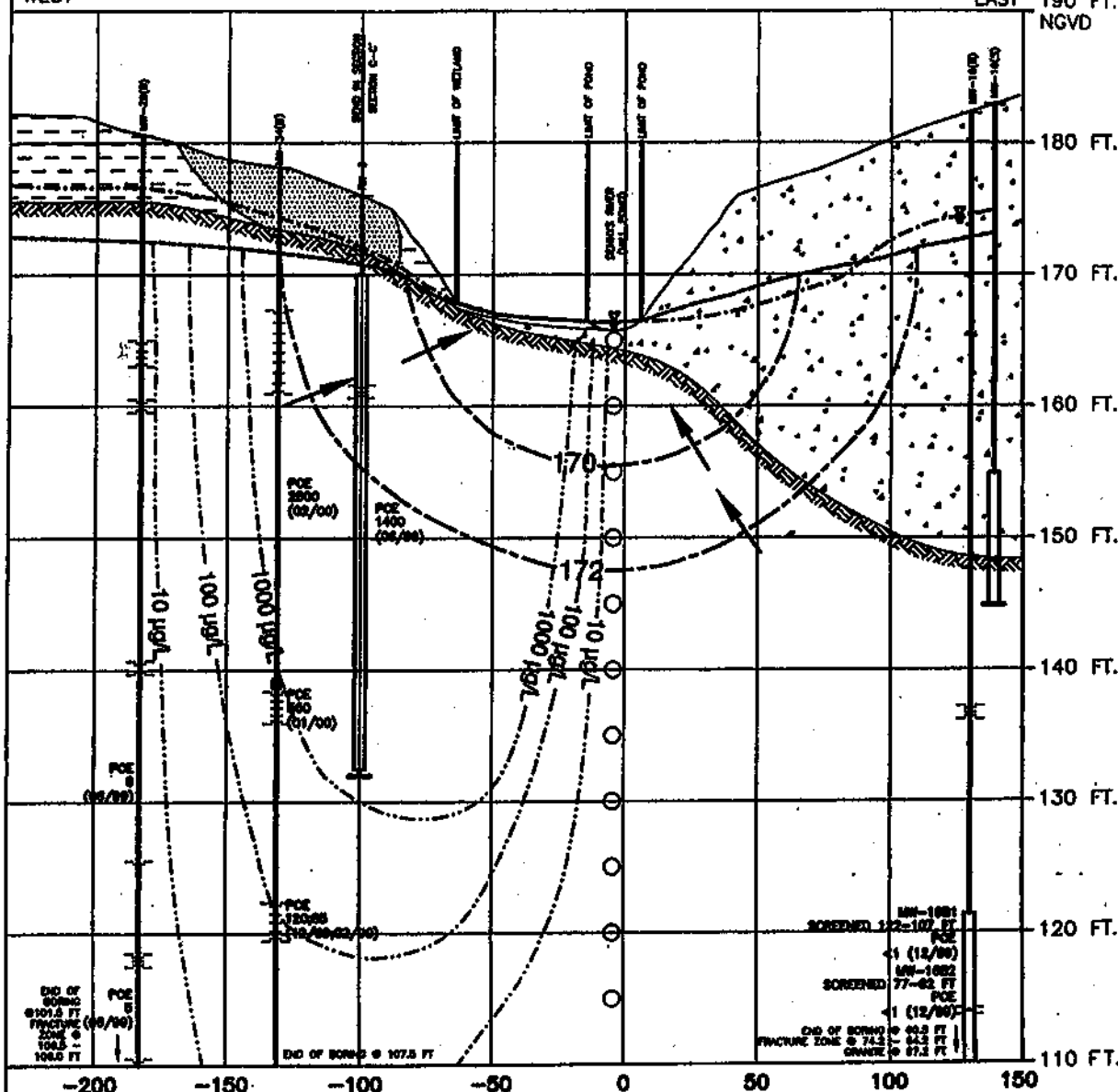
1999 MONITORING AND TREATMENT WELL LOCATIONS

EASTERN SURPLUS CO. NPL SITE





WEST

EAST 190 FT.
NGVD**LEGEND:**

- FINE SAND/SILT/CLAY
- SANDS/GRAVEL
- TILL
- BEDROCK
- FLOW DIRECTION
- ESTIMATED PCE CONTOUR CONCENTRATION IN µg/L
- ESTIMATED GROUNDWATER DIVIDE

FEATURE LEGEND:

- FEATURE
- GROUND SURFACE ELEVATION
- 45 (12/98)
- PCE CONG. IN µg/L
- FRACTURE ZONE (DATE)
- PACKER
- SCREENED INTERNAL
- END OF BORING

NOTES:

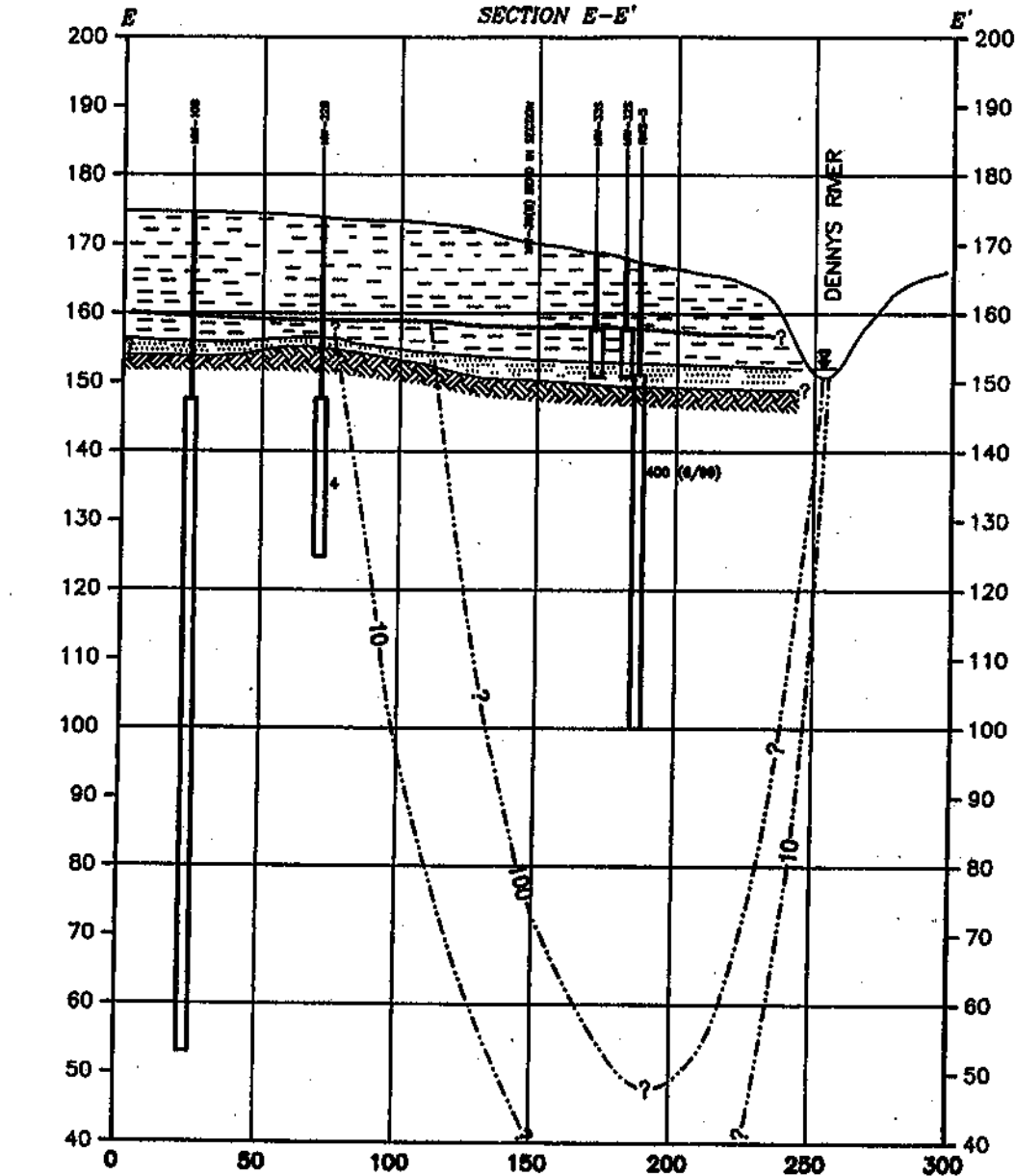
1. ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE.

GRAPHIC SCALE

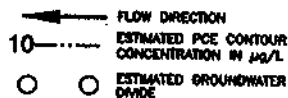
HORIZONTAL SCALE: 1 INCH = 60 FEET
VERTICAL SCALE: 1/10 HORIZONTAL SCALE

FIGURE 19
NORTHERN PLUME CROSS-SECTION
EASTERN BURPLUS COMPANY - NPL SITE

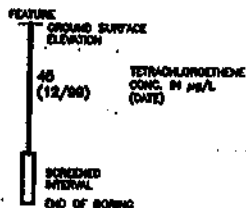
SECTION E-E'



LEGEND:



FEATURE LEGEND:



NOTES:

1. ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE.

GRAPHIC SCALE



HORIZONTAL SCALE: 1 INCH = 60 FEET
VERTICAL SCALE: 1/10 HORIZONTAL SCALE

FIGURE 20
SOUTHERN PLUME CROSS-SECTION
EASTERN SURPLUS COMPANY - NPL SITE

LEGEND

- FISH [$\mu\text{g/kg}$ OF PCBs]
- MUSSELS [$\mu\text{g/kg}$ OF PCBs]

NOTES:
1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE



EASTERN
SURPLUS
COMPANY
SITE

MILL POND

Former Residence
(Demolished)

ALBINO FLOATER (0.00428)

SMALL MOUTH BASS (0.318)

WHITE SUCKER (0.08338)

Former Carter
Baker Building
(Demolished)

Residential

ROUTE 101

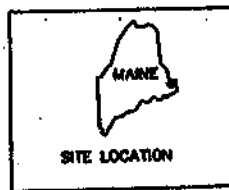


FIGURE 21
FISH AND MUSSEL SAMPLING LOCATIONS NEAR ST.
EASTERN SURPLUS COMPANY - NPL SITE

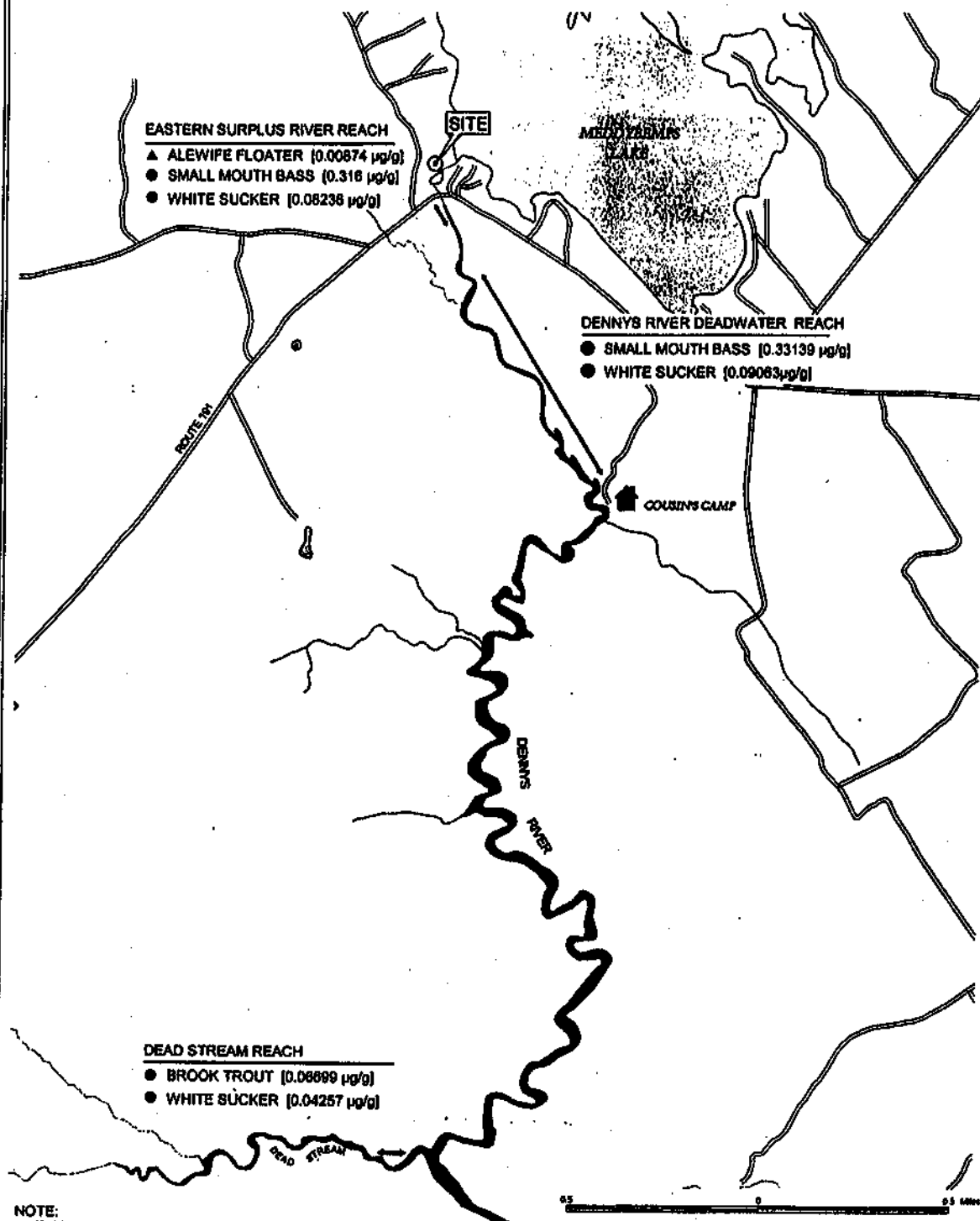


FIGURE 22
FISH AND MUSSEL SAMPLING LOCATIONS
LOWER DENNY'S RIVER
EASTERN SURPLUS COMPANY NPL SITE

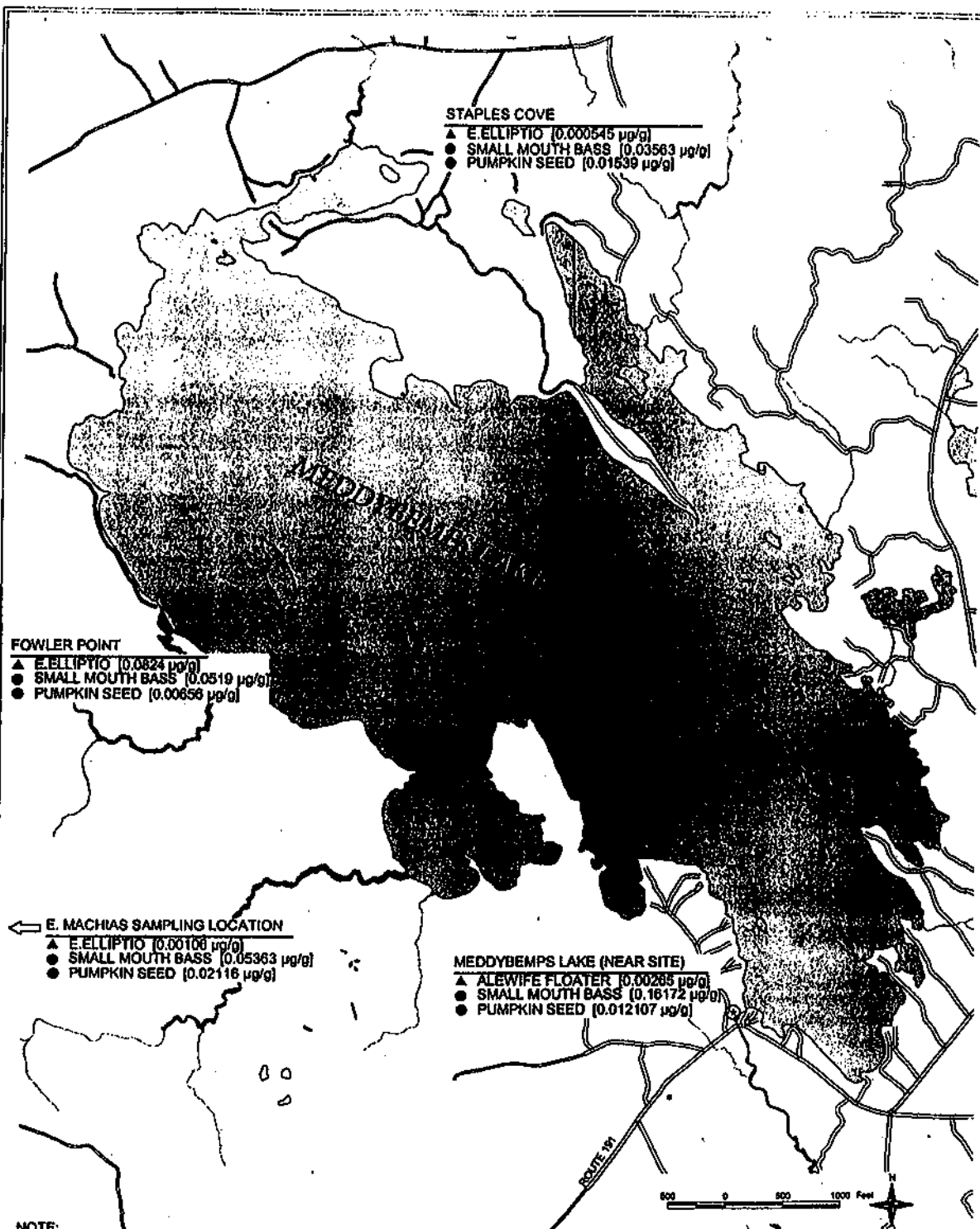
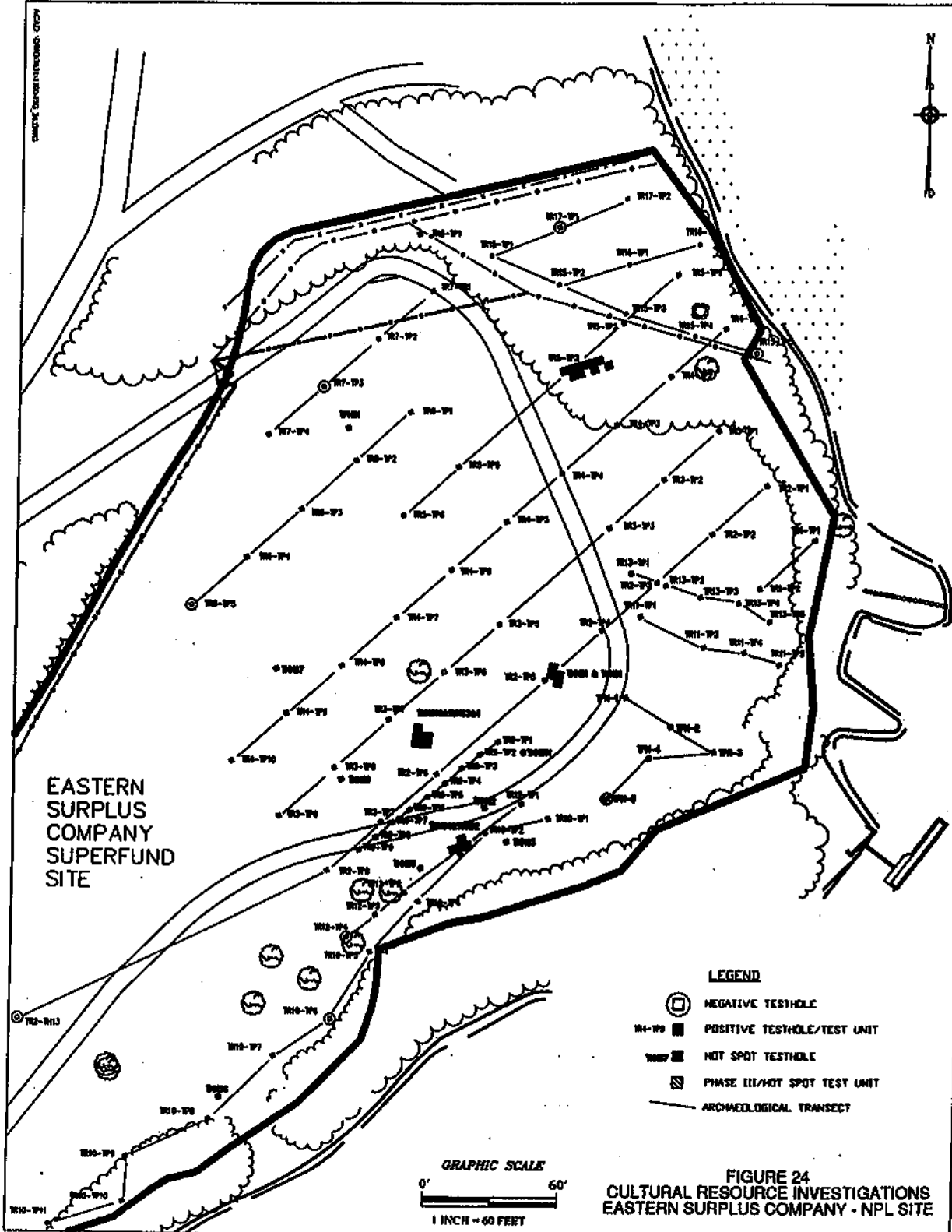
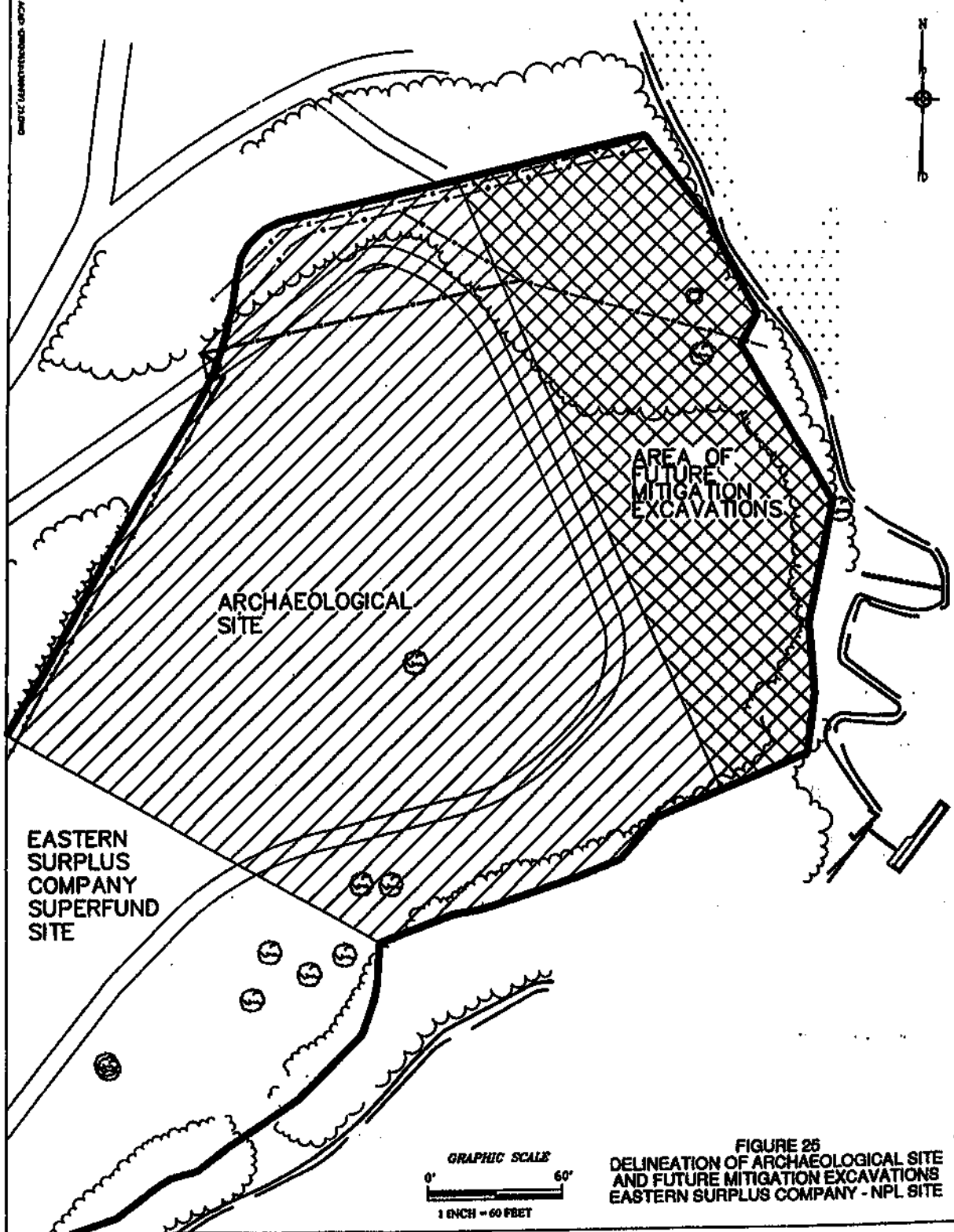


FIGURE 23

FISH AND MUSSEL BACKGROUND
SAMPLING LOCATIONS

EASTERN SURPLUS COMPANY NPL SITE





**FIGURE 26
DELINEATION OF ARCHAEOLOGICAL SITE
AND FUTURE MITIGATION EXCAVATIONS
EASTERN SURPLUS COMPANY - NPL SITE**

LEGEND

- APPROXIMATE SITE BOUNDARY
- SURFACE WATER FLOW DIRECTION
- RW-4 ● LOCATION OF PROPOSED RECOVERY WELL WITH IDENTIFIER
- APPROXIMATE GROUNDWATER PLUME BOUNDARY
- △ IS-15 OVERBURDEN INJECTION WELL WITH IDENTIFIER
- ▲ IS-30 BEDROCK INJECTION WELL WITH IDENTIFIER

NOTES:

1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.

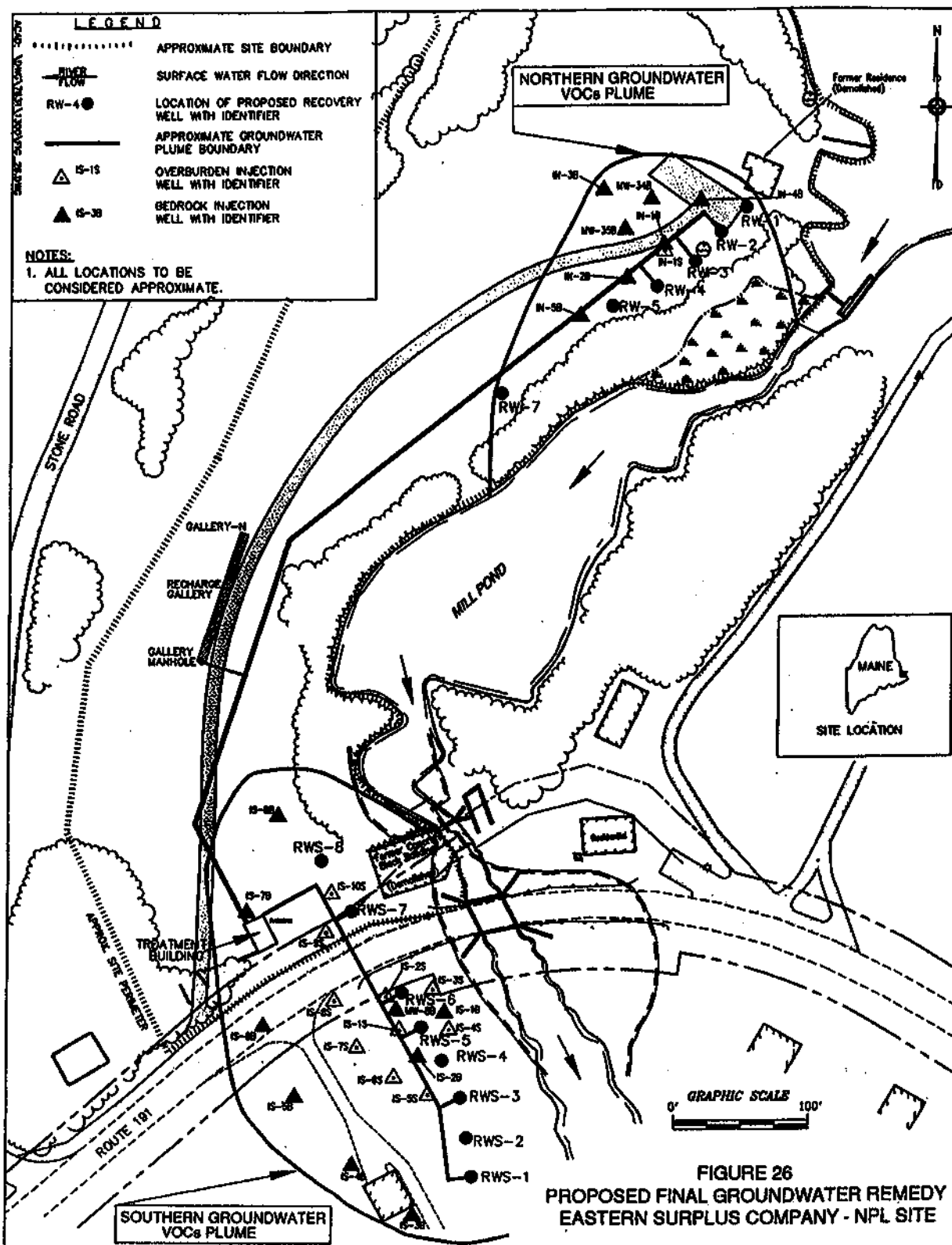


FIGURE 26
PROPOSED FINAL GROUNDWATER REMEDY
EASTERN SURPLUS COMPANY - NPL SITE

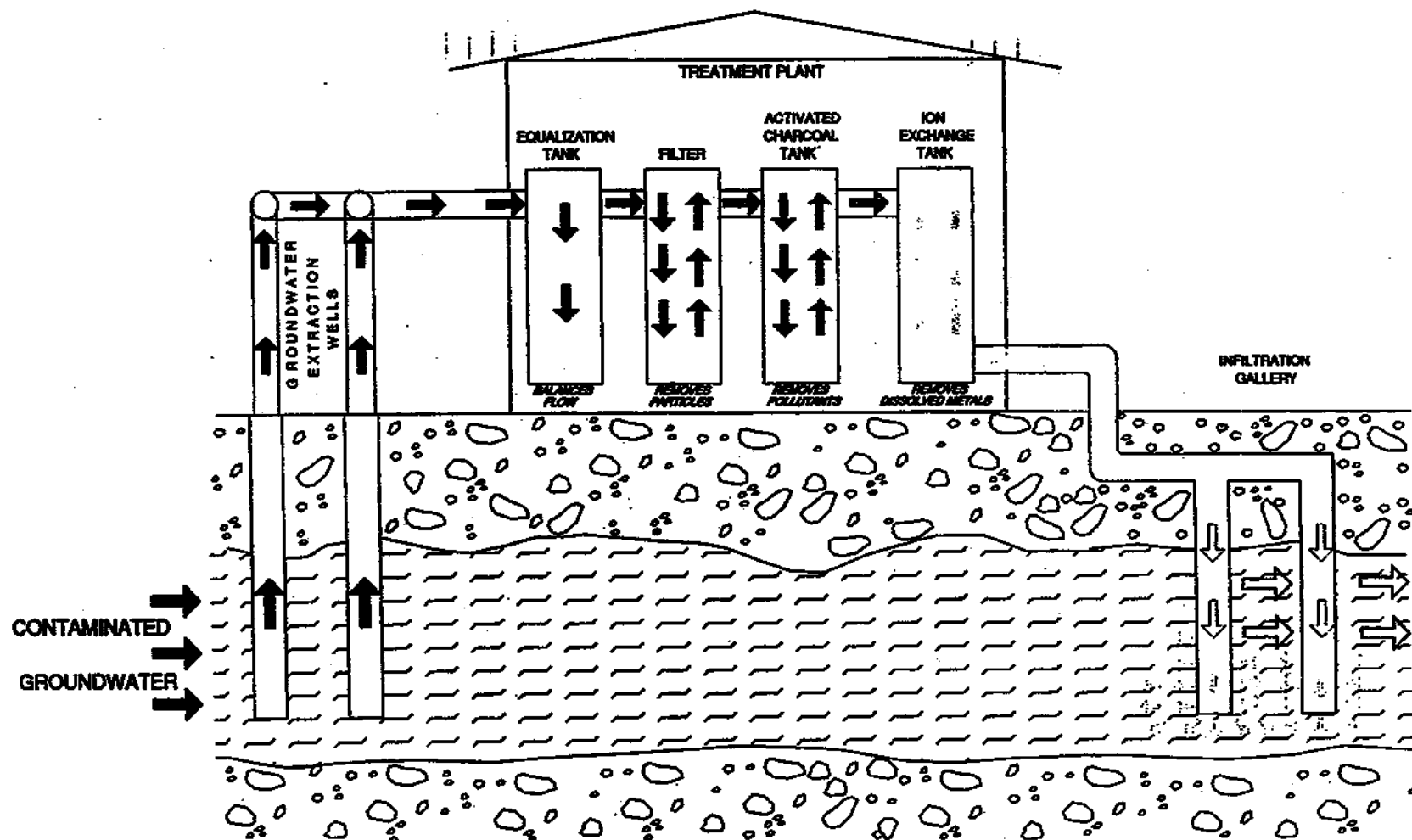


FIGURE 27
GROUNDWATER EXTRACTION
AND TREATMENT SCHEMATIC
EASTERN SURPLUS COMPANY - NFL SITE